Australian Personal Computer

GET ON THE PHONE TO YOUR MICRO

REGISTERED FOR POSTING AS A PUBLICATION — CATEGORY B
REGISTRATION NO. VBP 3691. ISSN 0725—4115 NZ $3.50 DECEMBER 1983

$2.95*

AUSTRALIA'S TOP SELLING COMPUTER MAGAZINE

COMPUTERS IN THE GREAT OUTDOORS

We look at an Australian "do it anywhere" micro.

Apple II*

Vic 20**

Commodore 64**

Now you can play the smash Atari® arcade hits on your Apple II*, Vic 20** or Commodore 64**.

The graphics are great, the gameplay is fantastic! Atari arcade hits are so popular everyone wants to play them at home. And now you can! Atarisoft™ brings the Atari arcade hits into your home by developing programmes for Apple II*, Vic 20** and Commodore 64**. And there are Atarisoft™ arcade hits an the way for Texas Instruments TI 99/4A+ and the IBM PC#. Just look for these smash hits – Centipede™, Pac-Man[1], Donkey Kong[2], Stargate[3], Defender[4], Robotron[5], Dig Dug[6], and other Atari arcade hits in the colour coded pack for your computer.

ATARISOFT™

See the new Atarisoft™ arcade hits for your favourite computer at leading computer software stockists now.

Future Trends

Atarisoft is distributed by Futuretronics Australia Pty. Ltd., 1076 Centre Road, South Oakleigh 3167.

®and TM are trademarks of Atari Inc., or Futuretronics Australia Pty. Ltd. 1 PAC-MAN is a trademark of Bally Midway Mfg. Co. 2 DONKEY KONG, Maria and NINTENDO are trademarks of Nintendo. 3 STARGATE is a trademark of Williams Electronics Inc. 4 DEFENDER is a trademark of Williams Electronics Inc. 5 ROBOTRON 2084 is a trademark and copyright of Williams Electronics Inc. 6 DIG DUG is a trademark of Namco Ltd. Note: Not all products may be available at time of printing. *Apple is a trademark of Apple Computers, Inc. **Commodore 64 and Vic 20 are trademarks of Commodore Electronics Ltd. + TI99/4A are trademarks of Texas Instruments. # IBM PC is a trademark of IBM, Inc.

CONCORD/8665

SCOOP PURCHASE
100 UNITS ONLY

"everything but the kitchen sink"

$1795 incl tax

Osborne was first with the portable computer, and first to include professional business software with a basic machine. Now Osborne adds a special price on a quality printer. You don't need anything else to bring computer efficiency into your office or home today.

The Osborne Word Plus is the proven Osborne 1 computer, complete with double density disk drives and multiple format display for just $1795 incl S.T. That includes Osborne's standard word processing, spreadsheet and programming software. This system normally sells for $2695 — so you're saving $900 right away. On top of this, you get a voucher that allows you to buy a top quality 80 character per second dot matrix printer for just $429 (cable $69). This printer is identical with ones selling for $600 and over — you save 30%. The Osborne Word Plus gives you a complete business computer system for under $2300 tax paid — even less with a tax exemption. A system that can begin increasing your productivity today, and with plenty of power for the future.

Contact your nearest Data Parts store today for a demonstration of the Osborne Word Plus, the computer system with everything but the kitchen sink.

The Word Plus Printer

The Word Plus Printer is a dot matrix printer fitted with both tractor and friction feed for continuous or single-sheet paper. The matrix is a high quality 9x9 dot — with true descenders, 96 characters, four character widths, italic and graphic characters gives plenty of flexibility.

- Standard Centronics interface (compatible with Epson MX80)
- Print rate 80 characters per second
- Bidirectional, logic seeking for maximum output
- Switches for power, on line, line feed and form feed
- Indicators for power, on line, ready and paper out
- Endless loop cassette ribbon with a 6 million character life
- Replaceable print head with a life of 30 million characters
- Handles paper 100 to 250mm wide

OSBORNE 1 Standard Features —

Standard Hardware:

- Z80A™ CPU with 64K RAM.
- Dual floppy disk drives with 204K bytes storage each.
- 5" Green Phosphor CRT.
- Business keyboard with numeric keypad and cursor keys.
- RS-232C Interface.
- IEEE 488 Interface.
- Weather-resistant, portable housing.
- Operates on International voltages.
- 52/80/100 column display.

Standard Software:

- WORDSTAR® word processing.
- MAILMERGE® mail list.
- SUPERCALC™ electronic spreadsheet.
- CBASIC™ programming language.
- MBASIC™ programming language.
- CP/M® operating system.

OSBORNE 1 Optional Extras —

- Battery pack for one hour of processing.
- 300 baud auto-answer, auto-dial modem complete with software. (Pending Telecom approval).

Optional Software —

Forth™, Microsoft™, DataStar™, SuperSort™, Personal Datebook™, Mailman™, Milestone™, Money Maestro™, muMATH-80™, System Checker™, Disk Doctor™, BSTAM™, Word-Pac™, Spellguard, MathStar, Grammatik, DocuMate Plus, Footnote.

TRADE ENQUIRIES WELCOME — CASH/CHEQUE OR BANKCARD WELCOME HERE

DATA PARTS

MAIL ORDER CENTRE
11 EDWARDS STREET,
SHEPPARTON VIC 3630
Telephone: 21 7155 (058)

- **ALBURY 658 Dean Street** Telephone: (060) 21 8080
- **BENDIGO 27 Bath Lane** Telephone: (054) 43 4866
- **BALLARAT 307 Main Street** Telephone: (053) 31 3999
- **SHEPPARTON (As Above)** Telephone (058) 21 7155

inside

Managing Editor Sean Howard; *Consultant Editor* David Tebbutt; *Advertising Manager* Gerard Kohne; *Advertising Executive* Philip Treyvaud; *Art Director* Mike Northcott; *Typesetter* Marcia Brown; *Subscriptions Manager* Valerie Meagher; Printed by Quadricolor Industries Pty Ltd. Subscription rates: Australia $35.00 per annum. Overseas A$47.00 (surface). A$130 (airmail). Published by Sean Howard Productions, 3/500 Clayton Road, Clayton, Vic 3168; P.O. Box 298, Clayton 3168. Telephone: (03) 544 8855. Telex AA 30333 AMJ. Material contained within *Australian Personal Computer* is protected by the Commonwealth Copyright Act 1968. No material may be reproduced in part or whole without written consent from the copyright holders. Produced under licence from Computing Publications Limited and VNU Business Publications B.V.

REGULARS

4 PRINTOUT
We bring you all the inside information on what's been happening in the micro world this month.

28 COMMUNICATIONS
Prize pickings from our mailbag. Keep in touch!

103 NEWCOMERS START HERE
If you've just put your toe in the murky waters of microcomputing, let us create a little clarity.

108 BLUDNERS
Who spotted them first? You or us?

111 TJ'S WORKSHOP
Stacks of useful hints and tips from readers.

118 NUMBERS COUNT
The *APC* mathematician goes into the intricacies of 'the persistence of an integer'.

120 SUBSET
The assembler experts present their monthly round-up of clever subroutines.

135 YANKEE DOODLES
Vital hot gossip on what's looming from the other side of the Pacific.

141 BIBLIOFILE
Let someone else do the hard work for you. Find out what's worth reading.

144 LAZING AROUND
Gear the old grey matter into action with a few tricky brain teasers.

146 SUBSCRIPTIONS
Unashamed appeal from our publisher for your cash.

146 BACK ISSUES
Find out what you've missed and order it now — or get three free with our special subscription offer.

149 DIRECT ACCESS
Includes Network News, full User Groups Index and Diary Data.

159 PROGRAMS
This month's collection of serious and fun programs include listings for the VIC-20, MicroBee, VZ-200, Apple and TRS-80/System 80.

175 CHIP CHAT
The cutting edge of the micro industry.

175 ADVERTISERS INDEX
Need to find that ad in a hurry? Here's a breakdown of all advertisers in handy alphabetical order.

APC
Volume 4, Number 12, December 1983

FEATURES AND SERIES

35 COMPUTERISING YOUR BUSINESS
PART 2 : SETTING UP
Heartfelt instruction on how to transfer your manual turmoil into computerised efficiency.

49 SORT TREES FOR BEGINNERS
Paul Overaa, our structural programming expert, gives more hints on good methods.

76 GARDEN OF EDEN
Thoughts on the strange names we choose for our machines.

95 PRINT BIG
How to get the old Epson printer doing clever things from personalised stationery to screen dumps.

105 BULLETIN BOARD
Find out how your micro and your telephone can put you in touch with a network of friends, national and international.

BENCHTESTS & REVIEWS

43 EXECUTIVE 816
Transportable and Australian: we test this low priced local offering.

62 FOCUS ON VISI ON
A portable, lower-priced, but decidely less glamorous version of Apple's friendly Lisa system.

79 LOTUS 1-2-3
One of the new generation of fully integrated business software packages. Mike Liardet focuses on the spreadsheet element.

124 TANDY MC-10
A beginners' machine to compete with the VZ-200 and Spectrum? — Surya investigates.

129 GEMINI 15X PRINTER
Ian Davies with another entry into the tough printer market.

'Don't look now, but there's the chap from the IBM advertisements . . .'

APC delivers its monthly package of micronews.

Fight to the finish

The boring battle between Microsoft's MS-DOS and Digital Research's CP/M-86 can actually be quite interesting in one way — it illustrates the different sorts of microcomputer, and how they are used.

For example, buried in the announcement of 'version 3.0' of an operating system called Xenix, is the observation that 'under Xenix 3.0, any MS-DOS file may be read from or written to, providing profitability of data between MS-DOS and Xenix machines'. And the announcement goes on to suggest that 'a number of machines, such as the Durango Poppy' (the what?) 'now run both operating systems.'

The list of such machines may seem as underwhelming to you as it does to me: but the important point is that the trick is possible simply because Microsoft has written both Xenix 3.0 and MS-DOS 2.0 with the same routines. So when a programmer asks the operating system to write data to a file, it does exactly the same thing for both operating systems on the same machine.

The interesting thing, however, is not how Microsoft has written the system. It is more a question of what sort of user will be running it, and there, Microsoft is firmly on the side of the user who is multi-.

It may help to pretend we're talking about filing cabinets and libraries, to show you what I mean.

In offices, anybody can have a filing drawer in a desk. The folders may be identical to the ones in the battery of filing cabinets, but the significant point is that only you can get at them, and there are only a few of them. No office user can afford a library all to themselves. However, the office may well have a central library, and here are two ways of using it. First, you can ring up the librarian and say what you want, and it will be brought (or left on a shelf at the door) for you. Alternatively, you can go down, and blunder around looking for the file or book you want yourself.

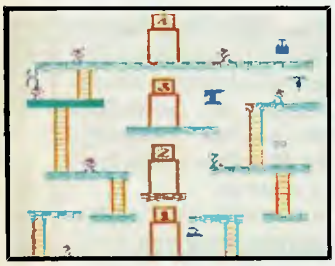
The 'librarian request' system is the same system as our own filing drawer. It just holds more. The other system, where several people can be looking for information at the same time, is obviously of more use to a business.

It is likely Dick Smith has done it again. Several years ago the firm imported a TRS-80 workalike selling for significantly less than the Tandy offering and was, of course, a huge success. Obviously holding the view that IBM's PC is, and will be, the market leader for some time to come, DS has come up with a hardware and software IBM PC compatible machine.

Pictured above in its basic and expanded configurations, a dual drive, 128k Challenger (excluding monitor) will sell for $2990 including sales tax. A similarly configured IBM PC currently sells for around $7,000. Also, Dick Smith throws in the popular Perfect Software series of business packages.

International demand for the product has prevented quantity deliveries of the Challenger to the Australian marketplace before early next year.

From the people who brought you "Robot Attack",™* "Defence Command"™* and many more great arcade hits comes Miner 2049ER™* – a fantastic action video game with 10 levels of difficulty. Miner 2049ER is already on its way to the top of the U.S. game charts. Mounty Bounty Bob™* takes you into the depths of an abandoned uranium mine after the notorious Yukon Yohan.™* But capturing Yukon Yohan is a dangerous mission. Every step brings a trap, trick or lethal challenge. You'll scale ladders, leap to within inches of disaster, jump off moving platforms, neutralize deadly mutants, even shoot yourself from a cannon. And all in a race against the clock.



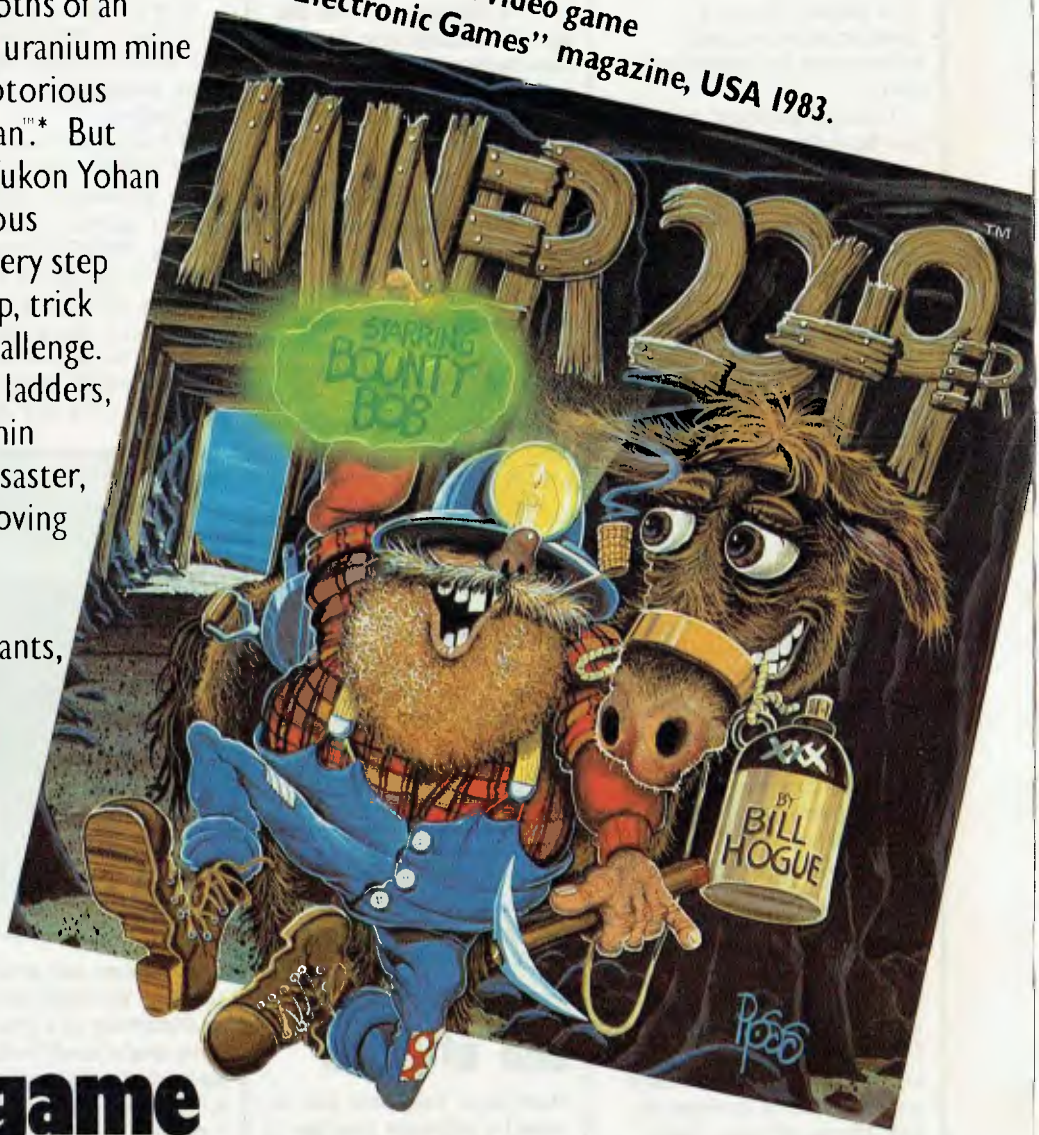
Round 3: The Transporters.

Round 7: The Mine Shaft.

Round 10: The Cannon.

This is video game action at its thrilling best. Challenge, skill, endurance, split second timing: you'll need it all to conquer the great Miner 2049ER.
So if you want multi-screen, full-colour arcade action play Miner 2049ER, the new smash hit video game for Atari home computers today.

Voted best action video game by "Electronic Games" magazine, USA 1983.



Available for Atari™ 400™ and 800™ home compute and the Atari 600XL™ and 800XL™ Supercomputers.™

"The video game of the year. Ten levels of traps, tricks and challenges."

Miner 2049ER is distributed by Futuretronics (Australia) Pty. Ltd.
Victoria/Tasmania (03) 579 2011 **New South Wales** (02) 517 2300 **N.S.W. Hamilton** (049) 69 6733 **Queensland** (07) 52 9633
Western Australia (09) 349 6111 **South Australia** (08) 297 5612
®and TM are Trademarks of Atari, Inc. or Futuretronics Australia Pty. Ltd.
TM* "Miner 2049ER", "Bounty Bob", "Yukon Yohan", "Defence Command" and "Robot Attack" are trademarks of Big Five Software.

Futuretronics®

CONCORD/B688

Now, two years ago, it was fairly simple to relate all that to computers. A mini-computer was big enough to work as a central library. A microcomputer, on the other hand, could only work as a desk drawer. It was a question of how much information you could get into it.

Today, a personal micro can have the storage and processing power of a largish minicomputer, which means that people installing an 'office library' type of system might well choose an ordinary machine. And they can then pretend that it is a multi-use mini.

Admittedly, people did try this two years ago, but they soon gave that up as a waste of time — rather similar to having an illiterate librarian.

However, there is another way to use the power of these machines, and that is to use them as if they were enormous office libraries, but for the use of one executive. In library terms, the idea is nonsense. In computer terms, the cost of new micros is so low that it's easy. The technical term used is 'multi-task' systems, where one user at one micro can actually be doing three or four things at once.

Where Xenix aims, primarily, to let three or four people all work on the same block of data (essential in medium-sized offices) the Concurrent CP/M-86 system aims to let one person have constant access to three or four blocks of data. That long-winded explanation will have been very old hat for some readers: but without it, there was no way to explain why the announcement of the new version of Xenix was important to people who think they are using 'mini' computers, rather than to people who have personal micros. The other thing that needed explanation was the fact that though (no doubt) Microsoft will accept the publicity as 'evidence of MS-DOS market lead' it is in fact a different market. And CP/M-86's availability with windowing, may be a far more significant matter for most users.

Guy Kewney

64 assembler

Commodore has released an Assembly language package for the Commodore 64.

Commodore's Assembler 64 contains a full screen editor with more commands than BASIC, a DOS Wedge program that provides additional commands to make disk access easier, two loader programs that allow the user to load an object program anywhere in memory and a power monitor program for de-bugging, as well as the standard ability to **create**, assemble, load and execute code.

The package is available through all Commodore dealers for $60.

Bee utilities

High-Tech Tasmania has released a software package in Eprom. The package constitutes eleven programs written by Tom Moffat including a debugging routine that freezes a program in **mid-run** and displays the contents of all the Z80's registers, an on-screen hexdecimal conversion **and** (occupying just under half the Eprom) a disassembler.

For those who use the Microbee's editor/assembler as a wordprocessor, there are some programs to make the task easier.

MANU sends control codes to a C-ITOH printer to set it up in manuscript format... big left margin, and double spacing. WORDS provides a count of the words written into the EDASM's primary file. There's also a program to initialize the Microbee for use with a parallel printer. The Microbee does not do this itself except under Basic.

Finally, three general use programs represent a "best of Tom Moffat" collection: The popular radioteletype decoding program, the facsimilie "picture plucker" program, and the Microbee audio frequency counter.

The memory required for these eleven programs, presented individually, would run to much more than 4k. The space saving is achieved by sharing subroutines among several programs. The package is available in a type 2532 EPROM for both the standard (2MHz) Microbee, and the IC model (3.375 MHz). The cost, including postage and instructions, is $50.00. Enquiries to High-

Commodore has announced its portable version of the popular '64 called the SX64. First supply will be available in December at a price of $1,899 — including a single disk drive and a small built-in colour monitor. It has all the same options (peripherals and cartridges) as the standard Commodore 64 and can run CP/M using a Z80 processor (selling for an extra $80). Basic V2 is in ROM which is the same as that used in the Commodore 64. Overall, the unit is like a boxed up '64 without provision for cassette I/O, so it's compatible with '64 disk and cartridge but not cassette based programs.

MAX FOR MICROS

How can I afford to give my clients the necessary time to ensure they and their systems work efficiently? Easy...

SERVICE IS MY BEST ADVERTISEMENT

COMPUTERMAX

PH (02) 93 1383 AH 908 1718

539 PITTWATER RD, BROOKVALE 2100

IMAGINEERING

presents

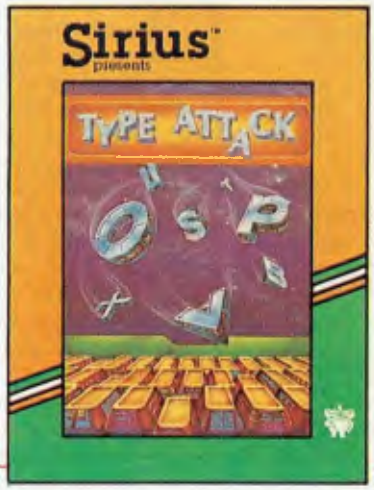
TYPE ATTACK™

© 1983 Sirius

Sirius™

Apple II, II + & IIe Disk

Atari 800
VIC-20 Cartridge
Commodore 64 Disk



For more information contact your local dealer

IMAGINEERING™
"The Art of Software"

579 Harris Street, Ultimo, N.S.W. 2007. Telephone: (02) 212 1411

any other way of designing a computer became an anachronism, like a car with the driver outside.

And the other thing it seems to reveal clearly is the fact that $4000 is going to be as much as people will pay for a microcomputer.

Guy Kewney

Bringing Tandy into line

Even if you have written thousands of lines of Basic, you probably never asked yourself why it was that Basic uses line numbers. They are there, you use them. And you probably never thought for a moment that you might manage without them.

In the new Tandy 100 (the hand-held thing I mentioned last month), Microsoft has taken the first steps towards abandoning Basic line numbers.

Normal Microsoft Basic uses line numbers for two purposes. First, as line labels — 'GOTO 123' means 'execute line number 123' and the interpreter would find the line just as quickly if you called it 'Jane' and said 'GOTO Jane'. And second, it uses the numbers as editing indicators: 'EDIT 123' means 'show me the line, and I'll give instructions to delete, insert, or otherwise change it.'

Now anybody who has ever used a Commodore computer will know that this is a stupid way to edit a line. Anybody who has used a text editor will know the same thing. All you have to do is move the cursor to the place, and either insert or delete until you are happy.

In the Tandy 100, the first big step has been taken, because when you say EDIT, the whole program is turned into an ordinary text file, and you can use the normal text editor to do exactly what a text editor does. You move the cursor to the offending places and make the changes.

Now the question you should ask yourself is: why use line numbers for editing?

In the old days when Basic was invented, the answer was simple.

People using Basic were students. They sat at Teletype printers, which were very slow, and were connected to a central computer, far away, shared with many other students. And on a Teletype printer, there simply is no earthly way to roll the paper back and alter the line above. And even if there were, you certainly couldn't stretch the paper and insert three new lines.

What you did was to type, carefully, until your whole program (you had worked it out with a pencil) was in. You would try RUN, and it was full of bugs, naturally, so you typed LIST. Ten minutes later, you had ten feet of program listing next to you.

Obviously at this point, it was somebody else's turn with the terminal, so you went back to your classroom, and started working slowly through the listing. You would find missing lines, and would want to insert them at the right place, and you would find mistakes, and would want to edit them. So back you would go, and would type line numbers to tell the editor where you

MEMOREX
FLEXIBLE DISCS
MEMORY
EXCELLENCE

MEMOREX PTY LTD, SYDNEY (HEAD OFFICE) (02) 908-2211; MELBOURNE (03) 267-2955; PERTH (09) 381-7155.

DISTRIBUTORS: NSW: Sydney — Atac Pty Ltd (02) 436-2477; N.T.T. Supplies (02) 357-5522; Wilbroprint and Computer Supplies (02) 699-9933; Word Express Pty Ltd (02) 439-8966; Newcastle — C.A.T. Data Supplies Pty Ltd (049) 75-2982. **VIC:** Independent EDP Pty Ltd (03) 88-9308; Datatrend Pty Ltd (03) 233-7677. **QLD:** ECQ Electronics (07) 376-5677; Independent EDP Pty Ltd (07) 229-8820; N.T.T. Supplies (07) 52-7333; **SA:** Magnetex Pty Ltd (08) 79-9951; **ACT:** Word Express Pty Ltd (062) 81-1977 (The Word Processing Centre); **TAS:** Technimark Pty Ltd (053) 72-8622.

VECTORIO—64Z

TWO-IN-ONE

6502 « Z-80A FOR CP/M

APPLE COMPATIBLE

CENTRAL SPU, 6502 & Z80A
64K BYTE OF USER RAM MEMORY
FULLY PROGRAMMABLE KEYBOARD
NUMERIC KEY PAD
SPECIAL FUNCTION KEYS
UPPER AND LOWER CASE
FULL GRAPHICS 280X192 resolution
7 EXPANSION SLOTS
WILL RUN ALL APPLE AND CP/M SOFTWARE
#3 MONTHS GUARANTEE
FULL SERVICE AND SUPPORT

TELEPHONE: (03) 568-6911

$620 TAX PAID
COMPUTER ONLY

★★SPECIAL★★ COMPUTER, MONITOR, DISK DRIVE, CONTROLLER AND ALL CABLES

TOTAL PRICE $1170 TAX PAID

TELEPHONE 03 568-6911

MICRO PRO COMPUTERS
43 ATHERTON RD
OAKLEIGH 3166
MELBOURNE AUST

PLEASE FIND ENCLOSED CHEQUE
FOR THE AMOUNT OF $.....
FOR THE FOLLOWING.....
.....
.....
PLEASE SEND ME MORE INFORMATION
NAME.....
ADDRESS.....
SUBURB.....
STATE.....

NETWORK NOW

Up to 126 computers per network system. Runs CP/M PASCAL or Apple DOS.
The easiest to use.
NO priority computer needed. NO specialized technical installation.
Works on normal DISK DRIVES.
Supports any device whether HARD DISK, FLOPPY DISK, SILICOM MEMORY or MODEM.
With the fastest transfer rate.
Suitable for SCHOOLS or any EDUCATIONAL CENTRE, OFFICES (big or small), FACTORIES or even at HOME.

NETWORKING IS NOT EXPENSIVE

wanted the changes.

And after you were sure you had it right, you could LIST again. If you were still wrong, and found that you needed 12 new lines between ten and 15, you could RENUMBER.

On the Tandy 100, this is silly. If you change the stuff on the screen, you are changing the stuff in the memory.

Tandy, unfortunately, is caught neatly between the two stools.

You can edit your Basic program with a text editor, but there is also an ordinary Basic line number editor. And as soon as you come out of the text editor, you are back in the line number editor.

Line number editors are nice and traditional, but they really do need two things — an AUTO command, to save you from forgetting to type them — and a RENUMBER command, so that when you run out of numbers between the lines, you can make more room. For some reason, the Tandy has neither.

If you have to turn line 100 into line 110, it's easy enough. But then you have to look right through your program to make sure that you don't have a 'GOTO 100' anywhere.

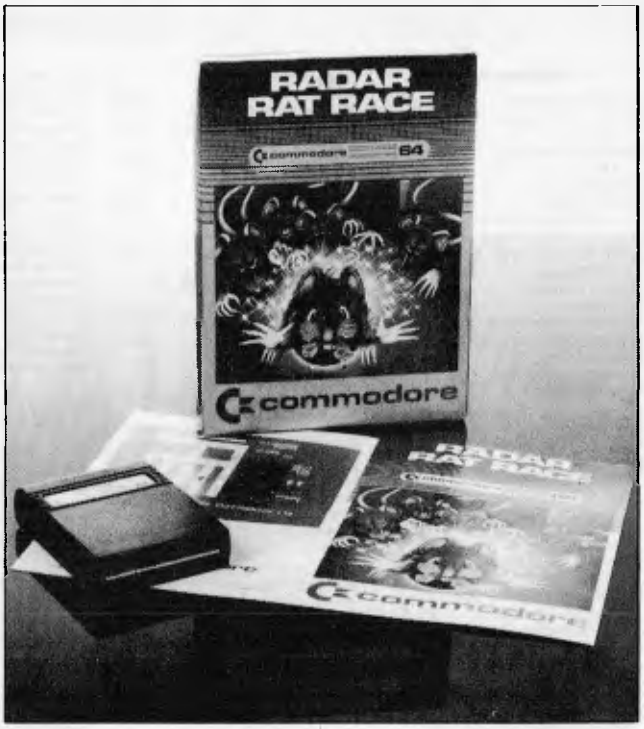
I hasten to insist that this is not a condemnation of the Tandy model 100, but I do warmly urge Tandy and Microsoft: either get rid of line numbers, or give us a RENUMBER command. Preferably, the former.

PC Junior upsets the Applecart

IBM remains tight lipped about the Australian release date of the PC Jr and any likely price. However we have received a special report from Chris Rowley in the U.S. on the American response to Big Blue's latest offering:

Decidedly mixed reviews greeted the IBM announcement of the PC Junior last week.

As far as the actual machine went nobody seemed very enthusiastic. IBM watchers noted that IBM had completed a major corporate re-alignment, moving away from the mainframe-only



Radar Rat Race is a Commodore 64 game which will be familiar to arcade games players of two years ago — but I haven't seen the original game around for ages, and I'm not going to name it, in case some humourless megalomaniac starts a lawsuit.

The game is important, however, not because it is good (though it may be) nor because it could feature in a lawsuit (it may never do so) but because, as you can see from the picture, it is a cartridge.

Commodore says that it is one of the first 64 cartridges. If anybody did one earlier, why didn't you send it to me?

Guy Kewney

ANNOUNCING . . .
THE CONQUEROR
A COMPLETE SOLUTION
Business/Scientific microcomputer
FOR UNDER $3000 — Including Software

. . . THAT INCLUDES THE CONQUEROR COMPUTER WITH A DISK DRIVE AND ALL THE SOFTWARE YOU NEED TO WORK BETTER AND FASTER WITH WORDS, WITH NUMBERS, AND WITH IDEAS, NOW.

POWERFUL NEW MICRO
Z80A CPU, 4MHz
64K RAM
2 SLIMLINE 5¼" DSDD DRIVES
2 RS232 SERIAL PORTS
COMPACT 6" X 6" X 12" CABINET
*OPTIONAL: 256K RAM, PARALLEL PORT, ADDITIONAL SERIAL PORTS WILL READ/WRITE MOST POPULAR MICRO FORMATS

POWERFUL SOFTWARE
COMPLETE SOFTWARE PACKAGING INCLUDING
—CP/M COMPATIBLE OPERATING SYSTEM
—PBASIC
—SYSTEM UTILITIES
—SPELLBINDER WORD PROCESSORS
—DBASE II FROM ASHTON TATE
—A TOTAL OF OVER $3000 WORTH OF POPULAR SOFTWARE—FREE

MULTI-USER
YOU CAN EASILY UPGRADE WITH ADDITIONAL DRIVES OR HARD DISK STORAGE AND GROW TO A MULTI-USER SYSTEM
DATA LOGGING SYSTEMS ALSO AVAILABLE

Now we also include "Business Master" full accounting system—(A/R, A/P, G/L, Stock/Invoicing)

Commercial and Professional Microsystems
9th Floor 505 St Kilda Road Melbourne 3004
Telephone: (03) 267 4755
Branch: 18 Park Rd Warburton 3799. (059) 66 2037

DEALER ENQUIRIES WELCOME

GAMETRONICS SOFTWARE BONANZA for SPECTRUM 16K — 48K

HARDWARE

PROGRAM NAME	PRICE
Spectrum Computer 16K	$289.00
Spectrum Computer 48K	389.00
ZX Printer	169.00
Printer Paper	5.00
Full Size Printer DT80	595.00
Full Size Printer PX80	650.00
Cent/Interf inc Cable & W.Processor	120.00
Digital Tracer & Software	190.00
Light Pen & Software	99.00
Loading Aid Sure Load Every Time	25.00
Speech Synthesiser Phonetic	120.00
Sound Generator 3 Channel	99.00
2 Way Motherboard	75.00
Spectrum Adaptor	40.00
Digital I/O Port Module	120.00
Analog Input Port Module	120.00
Analog Out Port Module	120.00
Realtime Clock Module	59.00
Light Pen Module	140.00
T.V. Sound out of the Spectrum Joystick Interface	50.00
Full Size Keyboard Coming Soon	

BOOKS

Understand your Spectrum	$17.95
Spectrum Machine Lang for Beginner	17.95
Over The Spectrum	15.95
The Complete Spectrum ROM Disassembly	23.95
Spectrum Hardware Manual	17.95
Spectrum Microdrive Book	24.95
Supercharge Your Spectrum	19.95
Exploring Spectrum Basic	16.95
Sinclair User Magazine	5.50
ZX Computing Magazine	6.50
Sinclair Projects Magazine	5.50
Sinclair Programs Magazine	5.50
Sinc Magazine	4.50
Users Book of Tape Recording	19.95

COMPUTING

Biorythms 16K	22.50
Convert ZX81 to Spectrum 16K	19.95
Display Generator 16K	14.90
Infrared Disassembler 16K	29.00
M-Coder II Compiler 48K	29.95
Machine Language 16K	20.00
Melbourne Draw 48K	29.95
Speakeasy 48K	15.95
Spectrum Forth 48K	39.95
Spectrum Assembler 48K	39.95
Spectrum Print Util's 48K	18.95
Spectrum Bug 2 16K	25.00
Super Draw 16K	22.00
Sys 64 16K	25.00
Ultraviolet Assembler 48K	33.00
Use&Learn 16K	35.00
Viepoint 3D 16K	29.00
VU-3D 48K	25.00

ADVENTURES

Adventure in Time 48K	$14.90
E.T. 48K	23.50
Espionage Island 48K	22.50
Forbidden City 16K	16.95
Gold 16K	26.00
Golden Apple 48K	25.00
Haunted Palace 16K	16.95
Inca Curse 48K	22.50
Krakit 16K	25.00
Mad Martha 48K	29.95
Mines of Saturn 16K	24.00
Planet of Death 16K	22.50
Rescue 48K	25.00
Ship of Doom 48K	22.50
The Hobbit 48K	39.95
The Orb 48K	25.00
Towers of Doom 16K	16.95
Rescue 48K	25.00
Haunted Hedges 16K	22.50
Pitman Seven 48K	22.50
Johnny Reb 48K	22.00
Privateer 48K	22.00
Roman Empire 16K	22.00
Samurai Warrior 16K	22.00
Paras 48K	22.00
Redweed 48K	22.00
Warlord 48K	22.00
Tyrant of Athens 16K	22.00

GAMES

3D Quadracube 16K	$22.00
3D Combat Zone 48K	22.00
Arcadia 48K	25.00
Avenger 48K	22.00
Cosmic Raiders 16K	24.00
Cosmic Debris 48K	22.00
Crazy Balloons 16K	25.00
Devil Birds & Digger Man 16K	26.00
Dodge the Demon Driver 16K	26.00
Embassy Assault 16K	19.50
Flight Simulator 48K	25.00
Frog 5 Show Down 16K	22.00
Frogger 16K	25.00
Galactic Patrol 16K	25.00
Galaxians 16K	22.00
Games 1 16K	20.00
Games 2 16K	20.00
Games 3 16K	20.00
Games 4 16K	20.00
Games 5 Star-Trail 48K	20.00
Games 6 16K	20.00
Gobbleman 16K	22.00
Gulpman 16K	22.00
Horace and the Spiders 16K	20.00
Horace goes Skiing 16K	20.00
Hungry Horace 16K	20.00
Invaders 16K	22.00
Invasion Force 16K	22.00
Light Cycle 16K	22.00
Maze and Death Race 48K	22.00
Meteor Storm 16K	22.00
Night-Flight 16K	25.00
Nightmare & Dragon Maze 16K	23.00
Over the Spectrum 1 16K	20.00
Over the Spectrum 2 16K	20.00
Over the Spectrum 3 16K	20.00
Penetrator 48K	22.50
Planetoids 16K	20.00
Schizoids 48K	25.00
Sentinel 48K	22.00
Space Zombies 16K	24.00
Space Intruders 16K	22.00
Space Raiders 16K	22.00
Space Rescue & Star Quest 16K	23.00
Startrek 48K	22.00
Terror-Daktil 4D 48K	22.50
Timegate 48K	29.00
Trog 48K	28.50
Monte Carlo 16K	22.00
Roulette 16K	22.00
Derby Day 48K	25.00
Jackpot 48K	25.00
Backgammon 16K	25.00
Scrabble 48K	44.00
Dominoes 16K	22.00
Reversi 16K	25.00
Brainstorm 16K	22.00
Psion Chess 48K	25.00
The Chess Player 48K	19.95
Cyrus is Chess 16K	27.70
Spectrum Chess II 48K	27.00
Spectrum Voice Chess 48K	27.00
Spectrum Chess 48K	27.00
Chess Tutor 16K	25.00
Test Match Cricket 48K	25.00
Football Manager 48K	29.00
Airline 16K	25.00
Auto Chef 48K	25.00
Dallas 48K	25.00
Handicap Golf 48K	25.00
Night Flight 16K	25.00
Frogger 16K	25.00
Manic Miner 48K	20.00
Panic 48K	20.00
Styx 16K	20.00
Pool 16K	20.00
Armageddon 16K	20.00
Digger Dan 16K	20.00
Sheer Panic 16K	20.00
Kong 48K	20.00
Chopper Rescue 48K	20.00
Electra Storm 48K	20.00
Break Away 16K	20.00
Luna Crabs 16K	22.50
Count About 16K	25.00
Hot Dog Spotter 16K	25.00
Lift Off 16K	25.00
Mind Out 48K	22.50
Frenzy 16K	22.50
Astro Blaster 16K	22.50
Trader 48K	29.50

BUSINESS

Comp-U-Share 48K	$35.00
Comp-U-Tax 48K	35.00
Home Banking 48K	35.00
Spreadsheet 48K	35.00
Data Base 48K	35.00
Word Processor 48K	42.00
VU-File 48K	25.00
Vu-Calc 48K	25.00
Stock Control 48K	55.50
S/L Business Accounts 48K	39.00
Critical Path Analy's 48K	55.50
Simple Word Processor 16K	22.50
Collectors Pack 16K	22.50
Club Record Controller 48K	22.50
Mat Calc 16K	14.90
Protext W. Processor 48K	24.90
Eddie A Word Processor 48K	25.00

NEW RELEASES AVAILABLE NOW

JETPAC — 16K
COOKIE — 16K
PSSST — 16K
TRANZ AM — 16K
ANT ATTACK

BUGABOO THE FLEA
TRAXX
VELNORS LAIR
XADOM
3-D STRATEGY

SMUGGLERS COVE
AQUA PLANE
CREEPY CRAWLER
PARADROITS
PAT THE POSTMAN

NAANAS
180
SAS ASSAULT
PRAX MAZE
LAND FAGAN

CRUISE ATTACK
TIME QUEST
LASER WARP
MAD MARTHA II
DEFENDER
KNOCKOUT

NEWCOMERS, STUDENTS, HOBBYISTS
X-MAS SPECIAL OFFER!!!

ZX81 plus 16K RAM plus 20 PROGRAMS
COMPLETE WITH MANUALS & LEADS READY FOR YOUR TELEVISION incl tax

$139.00 complete

gametronics

Shop 6/177 Toorak Rd, Sth Yarra 3142
Telephone: (03) 241 3031

Weekdays 10am — 6pm **Friday 10am — 9pm**
Saturday 10am — 1pm

MAIL ORDER
CHEQUE/MONEY ORDER/BANK CARD/NO.
PLEASE SEND ME

	PRICE	QTY.
SPECTRUM 16K	$289.00	
SPECTRUM 48K	$389.00	
ZX81 PACK	$139.00	

TOTAL AMOUNT PAYABLE
ADD $8.50 P&P H/WARE ex — ADD $2.50 P&P S/WARE ex
NAME..... ADDRESS.....
CITY.....
P/CODE..... EXP. DATE.....
PLEASE SEND FREE CAT. ☐
SIGNATURE.....

company of the seventies and establishing a position from which to become an information processor to the entire world.

In just two years IBM has produced the PC, the XT, the various XT specials like the XT370 and now the PC Jr. Analysts point to the end of the 13-year long Government antitrust suit a couple of years ago as the beginning of the new IBM.

At one extreme some analysts predict a speedy demise for Apple and just about everyone else in a totally IBM-dominated computer market five years down the road.

'IBM's new business computers will send Steve Jobs back to Atari sweeping the floors,' 'The game's over for Apple' and other such comments filled the air when the XT370 and the PC3270 appeared. Others, however, tended to disagree and pointed to the hardware for their reasons. From the unpleasant chiclets plastic keyboard to the price tag of $1500 for a 64k single disk drive system means critics found plenty to scoff at when PC Jr finally took the stage. In fact some were left wondering by the whole exercise. Noting that PC Jr won't be available until next spring or summer they questioned whether IBM was not just trying to freeze this year's Christmas micro market, getting would be micro buyers to put off their purchase for six months.

Clearly while PC Jr is not a business machine it sounds vaguely un-exciting as a home machine too. It doesn't do games very well. This is a 'home' micro for someone with a PC in the office who wants to take work home and who is loyal enough to IBM not to buy a Compac portable – or else it's a home computer to someone rather wealthy who is impressed by the IBM logo and reputation.

Apply can be expected to strike back, and have stripped-down Apple IIe's selling for $500 shortly.

And then of course there is the Macintosh, which will run the Motorola 68000 32-bit chip as a 16-bitter thus offering high speeds, for example allowing bit-mapped graphics without slowing down the applications software. This for just $2000.

In addition there is a strong rumour that John Sculley may have earned his Gold Marketeer Medal by ordering a reluctant Macintosh development department to make the system PC compatible. Apple has rarely made its own machines compatible with each other in the past let alone compatible with anyone else's but this is the shrewdest move possible because if you compare the rather ordinary PC with the Macintosh it is clear that Apple is streets ahead. The Macintosh with a 5Mb hard disk will probably cost $3500 and will come with bundled integrated software. The PCXT costs more than that without software.

Other computer makes face different problems. Coleco began getting Adams to the shops but there were still problems with the tape drives. However Coleco does have a golden opportunity if it can make enough machines by Christmas.

Likewise, Commodore finds itself wonderfully situated right now. The Commodore 64 is projected to sell 1.5 million units in the next year and is the clear and obvious winner of 1983's Home Computer Stakes. There are however some annoying flies in Commodore's well deserved ointment. The grim shortage of 1541 disk drives continues into its 11th week for many stores. Since Commodore rejected a batch of 30,000 drives from its Long Island supplier due to a high defect ratio, it has been scrambling to find replacement drives. Now another problem is emerging, namely the shortage of 1701 colour monitors. These nuggets of the nitty gritty have kept Commodore's stock from soaring as one might have expected.

Random news bits

One of Tokyo, Japan's, largest department stores, Seibu, has put two industrial type robots on sale in its store. At $25,000 a piece they are not likely to sell many but they sure are attracting crowds . . . Imports of integrated circuits from Japan for the first four months of the year reportedly increased 63% for packaged ICs and a whopping 252% for non-packaged ICs. By contrast, shipments of ICs to Japan increased by 11% . . .

MAKE YOUR COMMODORE 64 WORK!

PERSONAL DATA FILE

This Data Base is a simple to use personal data filing system suitable for home, club or small business use. It can be formatted to a maximum of 20 fields. Capacity depends on numbers of fields ranging from 100 to 240 plus records.

Sorts can be performed on any field and the first or last name in any field.

Easy to follow menu prompts and instruction pointer optional.

Tape or Disk **$59.95**

GRAPHIC WIZARD

Here it is! The greatest timesaver for the C-64 and VIC-20. The Graphic Wizard reproduces everything keyed onto the screen as nominated Basic program time! Simply build up a screen display and copy it with the Graphic Wizard. Can be used for animation, menus, titles, text and graphic displays.

Program also includes a merge utility to add your creations to any program.

C-64 Tape or Disk **$28.95**

VIC-20 plus 8K Tape or Disk **$28.95**

SMALL BUSINESS SYSTEM

The perfect program for any small business. This program produces all records required for taxation purposes. Imagine your yearly records finished and balanced for your accountant on the 1st of July.

Can be formatted for many printers. Produces full cash book display with up to 26 columns. Miscellaneous column can be set to 50 categories. Full yearly record of all cheques written and cash expenses. Complete bank reconciliation, cash flow figures and source. Produces running totals for all categories.

Requires disk drive and printer **$89.95**

ORDER HOTLINE (03) 735 4657 6 Days a week 9.00am — 6.00pm

CHEQUE OR BANKCARD

AVAILABLE FROM

GAMEWORX SOFTWARE

25 LANCASTER PLACE, CHIRNSIDE PARK 3116

DEALER ENQUIRIES WELCOME

"More... of the latest for

When the little Ozi Bear is on the box you can be sure you have the best in software or accessories for the VIC 20 or C64, from around the world.

Ozi Soft Expansion Board for VIC 20
Pictured bottom left

Getting cartridges in and out of the VIC 20 need no longer be a struggle with the Ozi Soft, 3 slot Expansion Board. The Board allows up to 3 cartridges to run simultaneously, with switching to turn off any of the 3 catridges if they're unwanted. The reset button enables you to clear memory without turning the VIC 20 off. Made in Australia this Expansion Board is something all Vic 20 owners should have. Available from your computer dealer for only
..... $59.95*

Ozi Soft Light Pen for VIC 20 and C 64
Pictured bottom centre

The first Light Pen designed and built in Australia. And adds new dimensions to home computing, making interfacing with screen graphic simple and versatile. Plus many other capabilities you should explore.
Complete with programme
..... $39.95*

FROM RAM ELECTRONICS

16K/3K Memory Expansion.
At last a sensible memory expansion cartridge for the Vic 20 that allows you to expand your Vic by an extra 3K for programs that require an extra 3K and without having to buy an extra cartridge to 16K. All this with just a flick of the switch. A very handy cartridge to own and whats more, it costs the same as a normal 16K cartridge.
..... $69.00*

..... $99.00*

16K Memory Expansion — Vic 20.
If you require a 16K memory expansion cartridge, then you cannot beat this one for price. Made in the U.K. this high quality expansion board will prove extremely good value.
..... $69.00*

Vicsprint 64 — C64.
This product will allow those who own centronics parallel printers to interface them with the Commodore 64. It allows for true Pet to Ascii conversion and will enable the printer to print out all Commodore graphics characters, and bit mapped graphics.
..... $119.00*

FROM TERMINAL SOFTWARE

Super Dogfight C64
As a pilot of the fabulous world war 1 biplanes two players can do battle in the sky. It's a great game with all the sportsmanship of the time $24.95*

Super Scramble VIC 20 & 64
Fabulous arcade action as you pilot your bomber over mountainous terrain seeking out enemy bases and avoiding attack. With 3

C=64, from Ozi Soft."

ships per game you have 8 sectors to master
..... C64: $24.95*/VIC 20: $19.95*

Super Gridder — C64.
A fight through the blackness of space to retrace the lines of a luminous grid. A fight against time in which skill and tactical cunning are needed to elude carnivorous scorpions. Two of the creatures pursue you through a series of eight different grids. If you can battle you way through that, prepare yourself for a third pursuer . . . and maybe even a forth! Three lives per game and the power to create temporary holes in the grid behind you to thwart pursuit, puts you in with a fighting chance. Eight different grids, 3 speed levels.
..... $24.95*

FROM SOLAR

Munchman 64.
Munch through the maze eating the dots while avoiding four hungry ghosts. A power pill in each corner of the maze, when eaten, allows you to gobble the ghosts for a short time.
..... $19.95*

Tri Count — C64.
This is the complementary package to the trilogy series and combines a complete general ledger package with 600 account classifications, sub total abilities and report generator: accounts receivable with up to 150 accounts per disk, complete reviews and age analysis can be created: inventory control will allow up to 300 items per disk with full search and find features. This professionally integrated accounting system will efficiently run a small business at the touch of a button.

Galaxions C64.
The Galaxions have arrived from a dying planet, determined to destroy civilisation as we know it. Only you can save mankind as they swoop and dive toward you. 100% machine code.
..... $19.95*

FROM VICTORY SOFTWARE

Annihilator — C64 and Vic 20
Now the fast-paced defender style game is available for the Commodore 64. Your aim is to defend your moon base from the atttacking aliens who launch heat seeking missiles to destroy you. Using the 64's sprite graphics and excellent sound. Victory Software has managed to come up with this exciting game that will keep you going for hours. _____ $24.95* and $19.95*

Kongo Kong — Vic 20 and C64.
This game provides hours of jumping barrels and climbing ladders. The object of the game is to climb the ladders to the top in order to reach the maiden in distress. 5 levels, with full sprite graphics on C64.
..... $19.95* and $24.95*

Metamorphosis — C64 and Vic 20.
You have stumbled into the nest of the Cyglorx and find yourself fighting off robot tanks guarding the Gyglorx eggs. You think you have everything under control and then the eggs start hatching!!!
C64 version features 4 different screens.
..... $19.95*

FROM ARTWORX

Monkey Math — Atari 16K, Vic 20 8K and C64.
Monkeymath's marvellous graphics and animation couples the fun and excitement of an arcade game with the opportunity to learn and practice number placement, addition, substraction, multiplication and division. Each of these skills may be practiced at three levels of difficulty. For ages 4 to 10.
..... Cassette $29.95*

FROM ISIS HATHOR

Basm C64
Basm is a basic that thinks like an assembly language, because it uses the syntax of basic, but works like an assembler. Basm has features for both the programmer familiar with assembly language and the novice interested in making the break from basic to machine code. This can allow your programme to run up to 85 times faster. It is a complete package with well over 100 pages of information to teach you this unique language
..... $99.00*

FROM ABRASCO

Abracalc C64
One of the most common programmes in the business world is the spreadsheet. It opens the door to a simple solution to a multitude of complex problems. Set up a home budget system, do business calculations, cash flow analysis and sales forecasts etc. What if questions can get instant answers. Simple to use and comes with a comprehensive manual, with all the features of a truly professional spreadsheet programme $49.95*

FROM OZI SOFT

Underworld of Kyn C64
This great game programme has taken months to develop and Ozi Soft is proud to release it as one of the best computer adventures yet. This intelligent programme understands complete sentences and challenges you to destroy the evil powers of the Wizard of Kyn. Escape the twisted underworld of tunnels and rooms. Then avoid the perils that lie beyond. Really something for all adventure fans
..... $24.95*

SNACKMAN-C64 & VIC20 . $29.92*
LASER STRIKE-C64 ..... $24.95*
GRAVE ROBBERS-C64 ..... $19.95*
MASTER FILE 64-C64 . . . Disk $39.95*
SUPER SPRITE C64 ..... $19.95*
TYPING TUTOR C64 ..... $19.95*
VIXPLODE C64 & VIC20 . . . $19.95*
THE VAULTS OF ZURICH C64, Atari 24K & VIC20 16K $29.95*
MAIL IT 64-C64 ..... $19.95*

Manufactured and/or distributed by:

*Recommended Retail price

Ozi Soft.

50 Clarence Street, Sydney.
Dealer enquiries invited
Telephone (02) 29 6330

According to the *Books in Print* reference guide, there are now 2400 computer books in print. . . . Intel is promising to start production on a 1-Megabit bubble memory device late next year that will sell for $99 in quantity . . . Microsoft will promote its new word processing program for the IBM PC by including a demo floppy disk in the November issue of *PC World* magazine. The program will be able to do everything but store and print the text. This promotion is expected to cost Microsoft several hundred thousand dollars.

Mah fellow Americans

The Bank of America in Australia is only a merchant bank and apparently this isn't to its liking.

Frankly it wants to get out there amongst the wretchedly nationalistic locals and introduce a little American know-how into our unsophisticated lives.

The noble savages in our national capital do not as readily see the benefits of having the Bank of America operating within our borders as the bank itself does. In fact the local banks don't see it either, bless their little free-enterprise hearts.

As one of the benefits that would accrue to the Australian people from a licensed Bank of America, the company is telling everyone about its version of Banklink and how much better-off we'd be, if we only had it to help our financial controllers run their companies, just like they do in Mexico, Brazil, the Argentine and Algiers. Why, if we did this we'd join the 22 users of the Bank of America's Balance Reporting and Funds transferring system in the US! It seems that the total US market for the system, (called with a somewhat cavalier attitude to Kodak,) "Microstar", is 35 systems. On a population basis this means that if the Bank of America is allowed to practise banking in Australia we will see two of these systems installed, if the Bank manages to gain the same sort of market share here as it did in the US.

Since the retail price for this system is about $20,000 the sale of such a thing as the Microstar wouldn't be a commercial proposition.

So why then is the Bank of America which normally deals in hundreds or even thousands of millions of dollars with nations who have little or no chance of paying back, interested in a $20,000 system? The only conclusion that can be drawn is that by offering the system it may induce the noble savages to trade with them. A $20,000 computer based system beats the hell out of a few beads and a tomahawk or two when dealing with the natives.

As the tale of the Microstar version of Banklink, sorry, Kodak, unfolded one looked out across Sydney harbour to see a landing barge just off Admirality House. Could it be the Grenada syndrome one pondered? Has the recalcitrant group of noble savages in Canberra hesitated too long in allowing in our American friends?

But no, we are too far away for a landing barge to make the journey and besides no one has recently assassinated anyone, just their characters in recent times.

The actual system offered under its Microstar modules and an overall cover called Microworld, another name that seems to be already in use by CW's main competitor, seems to be rather nice. But then we can't have it without the Bank of America as a general bank alongside the National Australia, the CTBA and Westpac. About our banks and Banklink, to paraphrase an American president speaking about one of the several Dictators that he was

Captioned "Olympia appeals to the people with its new 16-bit People micro computer released in Australia this week" (November 11), this picture, we suppose, is intended to demonstrate the enthusiasm people have for Olympia's People business micro. Somehow we don't think it quite hits the spot.

Despite this possible PR failure, the machine deserves a mention. It runs on an 8086 (true 16-bit) cpu, has from 128 to 512k of RAM and two 5¼ inch floppy drives with 640k capacity each. Higher disk capacity is available via a 10Mb winchester disk drive for $3,395. Four operating systems are available: CP/M-86, MS-DOS, CCP/M-86 and MP/M-86.

An optional colour monitor will become available, but without this, the People sells for $5495 including tax. Olympia is on (02) 439 3444.

running down at that time, "They may be sons of Bitches, but they're our Sons of Bitches".

Frank Linton-Simpkins

TAB on winning streak

The NSW Totalisator Agency Board is set on expansion into areas not originally envisaged when it was established.

For some time it has been apparent that the TAB has been rather "Over-gunned" as far as computing power goes and some means of employing his spare capacity was being sought, albeit without a great deal of publicity.

Now there are plans for the TAB to use its computer network to allow punters and others, sorry the TAB doesn't have punters, only "investors", to make theatre bookings, pay electricity supply bills and even water rates, in the place where they lose the money that they might need to pay the above bills etc.

The move came about when a special taskforce discovered that the TAB's computers were operating far below capacity. This is a discovery that is as surprising as finding that the sun rises in the east each morning.

To be fair, it is only the computer community that knew about the excess capacity and it had come to be part of the background

MBM PRESENTS IBM apple computer Personal Computers

Announcing our computer products IBM P.C. and XT, Apple IIe, III, Lisa

M M is Father Christmas
Call in and see our gifts

Announcing our Services

23 years of office experience,
90 day guaranteed,
5 computer consultants,
Yearly maintenance agreement,
14 Vehicles, Staff of 26,
On Site Service,
Fully Equipped Classroom,
Networking, Free Parking

Announcing our Training

Computer Training on IBM and Apple,
Preventive maintenance and care,
Basic Computer Terminology and Concepts
Elements of Word Processing,
Visicalc, DataBase and Accounting/Software,
Computer Setup and Installation

IBM Authorised Dealer IBM Personal Computer

METROPOLITAN BUSINESS MACHINE CO PTY. LTD.
338-342 SYDNEY RD
COBURG 3058
383 2222

apple computer Authorized Dealer

Tech Tasmania, 39 Pillinger Drive, Fern Tree, Tasmania 7101.

PC Videotex

BS Microcomp has announced a Videotex interface for the IBM PC. It is supported by software from Wolfdata which runs in conjunction with the Colorplus board. This is the first product in the market aimed at turning the IBM Personal Computer into a color videotex terminal and is a significant new addition to the multifunction capabilities of the PC.

In the near future a full videotex editing system will be released which will allow the user to create color displays quickly and easily. The Wolfdata color videotex system is compatible with any larger mainframe based system that uses the Prestel format. details on (03) 614 1433.

Sinclair's flat screen TV

So Sinclair has finally launched his new flat screen TV. Measuring just 5½ x 3½ x 1¼ in, it is half the size of its competitors and smaller than the average paperback book.

The machine was originally meant to sell at under £50 (in England), however, it looks as though Sinclair's costs are higher than expected because it is now priced at £79.95.

The main feature of the TV is the revolutionary flat screen which is produced by Timex. Most of the electronics to drive the screen are housed in one chip which is made for Sinclair by Ferranti.

The use of clever electronics has meant that the television can be used in virtually any country in the world that transmits pictures on the UHF band. The only major exceptions are France which uses SECAM and the USA which uses VHF for many of its transmissions. Sinclair says that there will be a VHF model available shortly.

Power comes from a flat battery developed by Polaroid which will give approximately 15 hours use, or from an external power source.

Portable report

Predictions have been made that in four years' time, two out of three micros will be portable.

The report, by market research company Frost and Sullivan, insists that low-cost units, selling down to $55, will only account for a fifth of the money spent.

Sales of all 'portables', says the report, 'are projected to reach $8.4 million units by 1987, worth $3.1 billion (in 1982 value dollars, that is)'.

This is an important report (it costs $1275, so it had better be), because it looks like being that rare beast, a genuine addition to existing knowledge. Most reports of this type are rehashes of what was learned over the previous year, with no relevance to what will happen next.

The only thing this report seems to lack is an understanding of how pervasive the portable will be. It rightly includes everything from the Basic-programmable calculator up to the Compaq imitation IBM as 'portable' but fails, I think, to consider the probability that by 1987, even desk top computers will have portable 'modules' attached.

As an example of a prototype, one might quote the plan to have a CP/M system based on a portable keyboard. The keyboard, removed from the system, would be usable in the great outdoors, far away from electricity supplies, but when plugged back into its master console, would report on its day's doings.

One might also look at the way Tandy 100 users plug their lap-held portable into their home systems.

It doesn't take much ingenuity to foresee the intervention of radio, to enable the thing to report back without even going home first.

But at least this report has grasped the simple fact that, once the Osborne and the Kaypro had hit the market,

Direct Computer Sales

We offer a range of Computer equipment for

* BUSINESS
* ENGINEERING
* EDUCATION
* SCIENCE
* HOME

HEWLETT PACKARD

IBM

apple personal computers

VIC 20

OSBORNE

HURSTVILLE

198 Forest Road,
Hurstville Shopping Centre
(02) 570-8344 TELEX: AA 21049

BANKSTOWN

Cnr North Terrace & The Appian Way
Bankstown Shopping Centre
(02) 708-5311

Direct Computer Sales
for direct customer satisfaction

COMPAK
Compak Computer Centre

- SIRIUS
- APPLE
- TRS
- VIC
- EPSON

COMPAK AND SPRING CIRCLE BRING YOU THE NEW DUAL PROCESSOR COMPUTER . . Z80 AND 6502

Standard memory: 64K
Twin built in slimline national drives: 246K
Disk controller: built in
Intelligent Keyboard: 10 Function keys definable by user. Lower case built in. Cursor arrow keys. Auto repeat on all keys. Numeric Keypad.

4 slots for optional 80 column card, RS232 card, PAL card etc.

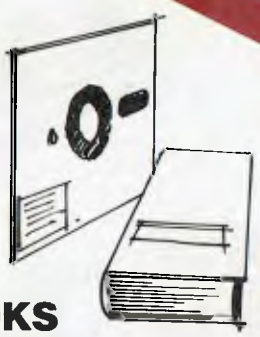
CAN RUN APPLESOFTWARE AS WELL AS CP/M

BACKED BY COMPAK'S FULL 180 DAY GUARANTEE

PHONE US FOR A NICE SURPRISE ABOUT THE PRICE!!

APPLE COMPATIBLE JOYSTICKS

VERBATIM DISKS
$38 BOX OF 10
DISK BOXES FOR 100 PLUS DISKS **$9.95**
PERSPEX LID **$10.00**
PRICES INCLUDE TAX



SOFTWARE AND BOOKS
APPLE/ATARI/TANDY/ VIC etc

350 South Road, Moorabbin,
Vic 3189. Tel: (03) 555 9844

®C. ITOH
®NATIONAL
®AMUST
®MEDFLY
®DISCOVERY

COMPAK
Compak Computer Centre

ALL PRICES INCLUDE TAX

COMPUTERS FOR CHRISTMAS

Commodore Vic 20

With colour and sound, cassette and games interface expansion capabilities for disk drives, printer and extra memory, joystick port, 5K memory, 8 border and 16 screen colours, 4 tone generators covering 5 octaves, 22 x 23 character screen display, 176 x 184 hi-res graphics display, 4 program function keys.

Commodore 64

Colour and sound, sprite graphics in 4 colours, sprite editor, expansion for up to 5 disk drives, printer, audio/video, user port, cassette interface, TV connector 64K memory. LOWEST PRICES.

Tandy Colour Computer

Probably the best supported new-generation computer today, with several magazines dedicated solely to the 80 C, and lots and lots of software available, from us and also Tandy. Uses the 8/16 6809 CPU with up to 64K user memory, 32 x 16 screen as standard (up to 64 x 32 under software control) and can use standard cassette recorders and disk drives. Two levels of Basic language available.

Komtek

The Komtek is a Tandy Model 1 work-a-like — but it is expandable up without the need for an expensive Expansion Interface. Runs Tandy Model 1 and most Model III software — only **$420.**

Tandy Model III

Available either as a 16K cassette based system, with integrated screen at **$1000** or our super model with 48K of user memory and two inbuilt disk drives giving 1.4 MB disk capacity, 5 mHZ clock speed (instead of 2 mHZ) and a crystal controlled real-time clock. Compare these specs with competitive computers. Twice the speed and twice the disk capacity of the standard Radio Shack version for **$2499.**

Redstone

This reasonably priced computer looks very similar to another very well known "fruit" computer and also appears to run all the ????-isle software. Check us for availability and prices, 64K as standard memory only **$800.**

Executive 816

The most exciting 8 bit portable computer today (see separate ad) only **$3395** including all software.

16 BIT COMPUTERS

Columbia

IBM P.C. Compatible, color monitor, 128K memory, 2 inbuilt drives and lots of software included in the price, including CPM86, MS DOS, the Perfect range of Filer, Speller, Link, Writer, Calc, and also Home Accountant, Macro 86 Assembler and Fast Graphs. Only **$4,999** for complete package.

Sirius

The acknowledged leader in the business field, with a minimum of 128K memory and expandable up to 896K! Minimum disk capacity is 1.2 MB, with 2.4 MB as an option. Extremely hi-res screen, 800 x 400 pixels, fully user definable keyboard and screen display, slow-decay anti galre green screen, fully adjustable, and a 10MB hard disk version is also available. Runs the latest accounting packages including the IMS Ascent package, the 16 bit MS DOS version of Peake Accounting and the reasonably priced Information Business Manager System. All are fully integrated Debtors/Stock/Creditors/ GL packages. Also runs Wordstar, Spellbinder, D Base II, Knowledgeman, etc. Call to see our catalogue of available programmes.

PRINTERS

Amust DT80

The most popular printer available today. 80 cps, tractor/friction feed, italics, bold, emphasised bit graphics, sub & super script, condensed and expanded type; all wanted features. **$449** inc tax (**$395** ex tax).

C. Itoh 1550

120 cps, friction and tractor, includes proportional type and spacing for near letter quality printing, pica, elite, condensed type, plus double width in all sizes. Tractors are behind the platen so no paper loss **$1,350.**

Amust 113 PD

A daisy-wheel printer that is also an electronic typewriter, fitted with a centronics interface, and types at 13.5 CPS **$950.**

C. Itoh F-10 Daisywheel

A 40 cps heavy duty computer letter-quality printer. Parallel **$2,100.**

Joysticks

For your Apple, top quality self centering. Brilliant value at **$33.**

BANKCARD ACCEPTED.

PHONE OR WRITE FOR OUR KEEN PRICES. WE BACK UP WHAT WE SELL.

350 South Road, Moorabbin,
Vic 3189. Tel: (03) 555 9844

noise level of the industry and wasn't any longer widely remarked on.

There are one or two points about the plans. Firstly the booking of theatre seats will start, (if the state government can get it moving without the traditional charges of corruption and links with the early release of someone or other,) with the Sydney entertainment centre and spread to the Opera House and then to other theatres as cafe society realises that it can get a bet on at the same time as it books for Parsifal, (Beyreuth eat your teutonic heart out!) Another thing is that the computerised booking of theatre seats in general hasn't had the best press, though the current incumbent, Mitchell's Bass is providing a very good service at not too great a cost. One recalls M/B's sometime competitor and its sad fate and wonders if there really is room for two?

It seems that the TAB plans involve the undercutting of the competition by 40 cents on a three dollar ticket. But one wonders which entertainments are on sale for something like three dollars per ticket?

It would seem that as the price of the ticket rose the apparent advantage of the TAB's percentage charge rather than the fixed fee of the opposition, might be reduced. If the seeming 20 per cent fee for the TAB booking service, e.g. 60 cents on that three dollar ticket, remains linear then a ten dollar ticket would cost a booking fee of two dollars and the opposition is well ahead.

Currently one has to pay one's rates by cheque to the Waterboard and one can pay one's electricity bills through one's pharmacy in certain cases and through one's nose in all cases. But to be frank it isn't everyone who wants to enter a TAB shop.

Many of them are less than attractive with, in some cases, clientel that reminds one of the characters in Damon Runyon's stories or in Bernstein's "West Side Stroy".

But we shall see.

Frank Linton-Simpkins

TELETEXT is Kaput

Time has run out for one Teletext department in the US because TIME Incorporated has decided to pull the money plug.

After just one year in the business of Teletext purveying Time has had enough and will cease its operations immediately, but will monitor the business to see if anything changes.

The cessation of the experiment comes just one month after Time killed off an experimental weekly Teletext style experiment to be distributed via cable TV networks.

The implications for Australia are obvious. Our market is far smaller than the US and we have a number of eager developers and sellers trying for a share. But if Time with its expertise has had trouble making it work out in the US what will happen here?

Frank Linton-Simpkins

Video manager

If you own a video cassette rental store — and who

doesn't — Data Parts has a video management package for $6,600 including hardware. At that price you can deal with 3,500 cassettes and 1,700 members, although this can be doubled for a moderate additional charge. The package does what you might expect — monitoring cassettes on loan, customer details, usage analysis etc — and runs on a Commodore computer.

Provincial Victorian readers will be interested to know Data Parts has four country shops (Albury, Shepparton, Bendigo and Ballarat).

IBM PC/Apple add-ons

Anderson Digital Equipment has been appointed Australian and New Zealand distributors of Quadram "personal computer enhancements". These include Quadlink (a board to allow the IBM PC to use most software available for the Apple II), Quadboard (an expansion board for the IBM PC with extra ports, clock and RAM) and Microfazer (a print spooler with a large 500k buffer). ADE is on (03) 544 3444.

This is absolutely unequivocally the last . . .

Another "ultimate" computer has been released. This time it's the Sharp PC-5000 being sold in Australia by Datakey and is pictured elsewhere on this page. It weighs 5 kg, is MS-DOS compatible and has an 8 line by 80 character display, 64k of ROM, 128k of "file" ROM and 128k (expandable to 256k) of RAM with an optional 128k of plug-in bubble memory. A built-in printer is also available adding about $500 to the expected retail price of $2500. Datakey is on (02) 32 8332 and (03) 419 5322.

Linda Graham, CEO of Microsoft's Aust. Sub.

Linda Graham said she was nervous because this was the first time that she had ever been interviewed by the press. It was all rather refreshing.

But while it was refreshing it was a mite hard to believe, not that she was nervous although it didn't show, but that she had never been interviewed before.

At one time in San Francisco Linda Graham was selling small business and home computer systems at a value rate of around $40,000 per week and that in itself would have rated attention, or so one would have thought, from the press.

She is tall and slim and really remarkably young to head the local subsidiary of a $100 million software corporation, so how did it happen?

Despite her success selling hardware and packages in the US, Linda Graham

The Sharp PC-5000. See 'This is absolutely, unequivocally the last . . .'

NEW
ATARI 600

IT IS HERE!

PHONE NOW AND PLACE YOUR ORDER
WITH AUSTRALIA'S OLDEST ATARI DEALER.
FOR SUPPORT GO WITH
THE EXPERIENCED DEALER

CALCUTRONIC PTY LTD
CALCULATOR AND COMPUTER CENTRE
797 GLENFERRIE ROAD,
HAWTHORN, VIC 3122
Telephone: (03) 818 6631

MELBOURNE HOUSE SOFTWARE

by Veronika Megler & Philip Mitchell

Visit JRR Tolkien's Middle Earth with The Hobbit, the most amazing adventure yet devised for any microcomputer.

Based on the fantasy land described in Tolkien's classic masterpiece, you assume the role of Bilbo, The Hobbit. It is you alone who can and must overcome all the dangers that overtake you in your attempt to steal the Dragon's treasure.

This revolutionary super program brings to life one of the most exciting mystical fantasies ever written and is a milestone in microcomputer software.

HUNGRY HORACE
Just when you thought microcomputer games had nothing more to offer, here comes Horace for your Commodore 64! Horace is a cute, lovable, animated character who races through adventures, creating havoc wherever he goes. The Horace series games brings you splendid graphics, addictive games and a lovable mischievious character. Hungry Horace is the original Horace adventure. Horace creates havoc in the park as he picks the flowers, annoys the guards and steals their lunch.

HORACE & THE SPIDERS
Horace is engaged in a hunt to rid the spider mountains of the deadly octopeds which inhabit them. He sets out with four phials of serum which protect him from the fatal bites, but when he has used these he must give up the hunt. Help him survive the hazards of the mountain and the bridge before engaging the spiders in a deadly duel in their web. An exciting and visually outstanding interactive computer game. Available January 1984.

HORACE GOES SKIING
Horace Goes Skiing is the sequel to the very successful Hungry Horace. Help Horace slalom down the mountain course between flags and avoiding trees — but first he must cross the roads to get to the ski slopes. A complex, colourful and outstanding computer game for the Commodore 64. Available December 1983.

VIC 20 UNEXPANDED

MINI KONG
Kong has abducted a young maiden and has trapped her at the top of his lair. You have to climb the ladders and use the lift to rescue her.

FROGRUN
Dodge the fast moving traffic on the freeway, the frog-eating snakes and get the frogs across the river to the frog-holes alive.

DOTMAN
An exciting version of the arcade maze game in which you control the DOTMAN as he goes around the maze gobbling all the dots.

SLAP DAB
Sam, the little painter has been told to paint a very large area. As he paints, he disturbs the woodworms which come out of hiding and start chasing him.

TINY TOTS SEVEN
A fun games cassette which includes, Simon, 0's & X's, Bombs Away, Super Snap, Duck Shoot and Santa.

GAMES PACK (VOL. 1)
Includes Lunar Docker, Slalom, Bounce Out, Snake, Bomber, Memory and Othello.

CRAWLER
Armed with a laser cannon in a mushroom garden you must fend off the crawly centipedes, spiders and fleas.

FOR THE VIC 20 16K

KRAZY KONG
Kong has abducted a young maiden and trapped her at the top of his lair. You have to climb the scaffolding and ladders to rescue her.

PHAROAH'S TOMB
The Pharoah's Tomb abounds with evil. Death will stalk you on your quest for the key which has the power to end the reign of evil.

THE DUNGEONS
Enter the fantasy world populated by ferocious monsters and a fire breathing red dragon that would deny you possession of the magic basket containing the secrets of the LOWER DUNGEONS.

3D TIME TREK
You are the only survivor of the planet 'Corillian' and have vowed to destroy those responsible for the destruction of your planet and rid the galaxy of the alien tyranny.

ZOK'S KINGDOM
When your starship encounters a meteor storm it is forced to crash land on the nearest planet which is ruled by Zok, a distant relative of Dracula. Dare you enter his kingdom.

XENO II
A space thriller to delight all arcadians. This game has four action packed stages and your mission is to destroy the power sources of XENO II.

GALACTIC ABDUCTOR
Your defenceless satellites are under relentless attack by ferocious armoured space hawks. An exciting arcade game with brilliant graphics and unusual sound effects.

FOR COMMODORE 64 & VIC 20

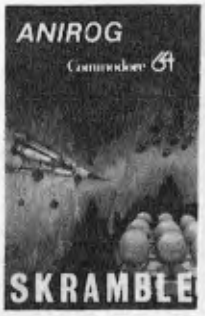
FROGRUN

In this game you have to get five frogs from the bottom of the screen to their frog-holes at the top of the screen. Unfortunately, this is not all that easy, because first you have to dodge the fast moving cars and lorries on the freeway, then the hungry frog-eating snakes on the river banks and then you must hop on the logs, crocodile's tails and turtles to get to the frog-holes.

KONG

Kong has abducted the beautiful starlet FAY RAY and has trapped her in his lair. There are four screens, as soon as you finish one screen, Kong removes FAY RAY to the next level. You have to finish all four screens and destroy KONG's lair before you can rescue the beautiful lady.

SKRAMBLE



In the year 2184, after years of constant bombardment, the planet earth has been taken over by Cobrons who have now departed but left the government in the hands of super intelligent command module. It requires a steady hand and accurate control to guide the fighter plane that has undertaken the suicidal mission of destroying the base!

HEXPERT

Bert is a small, charming furry creature who has been captured by an evil witch who forced him to play on her games pyramid. This three dimensional pyramid is constructed from hexagons. Bert has to change the top faces of all the hexagons to different colours by jumping from one face to another avoiding the rubber balls and snakes.

MOON BUGGY

While your moon buggy is out on routine patrol it is heavily attacked by fighters operating from a star-cruiser. You must skillfully manoeuvre your moon buggy over the lunar rocks, across the craters and destroy the alien attackers. This machine code program provides thrilling experience of driving across constantly changing landscape combined with fast and furious arcade action.

3D TIME TREK

You are the only survivor of the planet 'Corillian'. As your last act you have vowed to destroy all of those responsible for the destruction of your planet and rid the galaxy of the alien tyranny. Your mission is also a race against time, as you were wounded in the attack on your planet.

TO: **MELBOURNE HOUSE**, Suite 4, 75 Palmerston Crescent, South Melbourne, 3205. Telephone (03) 690.5336.

I have a ____ K Microcomputer. Please send me _____

I enclose cheque/money order for $ _____ PLUS $2.00 for postage _____

Please debit my bankcard A/C for $ _____ A/C No. _____

Commencement date _____ Expiry date _____

Name _____

Address _____ Postcode _____

Signature _____

Melbourne House guarantees to replace any faulty tapes immediately. Dealer enquiries welcome.

Commodore 64

- ☐ The Hobbit $39.95
- ☐ Hungry Horace $20.00
- ☐ Horace Goes Skiing $20.00
- ☐ Horace & The Spiders $20.00
- ☐ Super Cassette A $20.00
- ☐ Super Cassette B $20.00
- ☐ Frogrun $20.00
- ☐ Kong $20.00
- ☐ Skramble $20.00
- ☐ Hexpert $20.00
- ☐ Moon Buggy $20.00
- ☐ 3D Time Trek $20.00

VIC 20

- ☐ VIC 20 Games Pack $20.00
- ☐ The Wizard & The Princess $20.00
- ☐ Mini Kong $20.00
- ☐ Frogrun $20.00
- ☐ Dotman $20.00
- ☐ Slap Dab $20.00
- ☐ Tiny Tots Seven $20.00
- ☐ Games Pack (Vol. 1) $20.00
- ☐ Crawler $20.00
- ☐ Krazy Kong 16K $20.00
- ☐ Pharoah's Tomb 16K $20.00
- ☐ The Dungeons 16K $20.00
- ☐ 3D Time Trek 16K $20.00
- ☐ Zok's Kingdom 16K $20.00
- ☐ Xeno II 16K $20.00
- ☐ Galactic Abductor 16K $20.00

MELBOURNE HOUSE

APC12

wasn't into earthquakes. Frankly they terrify me as well so I have no quarrel with her on the subject. So after a particularly long lasting one that rated reasonably high on the Richter scale, Mrs Graham decided that she'd really like to move somewhere with an English speaking population, a relatively stable political system and non-vibrating real estate.

The latter requirement ruled out New Zealand and so she came to Australia and established an agency to sell Microsoft products in Australia.

The Microsoft agency was a three woman affair with Mrs Graham's mother as financial controller, Mrs Graham as chief marketeer and another lady in support.

Now the company has grown to double figures in personnel and Mrs Graham's mother is about to leave, since it is now a subsidiary and no longer an agency.

The departure of Mrs Graham's mother is possibly the first staff loss that the agency or subsidiary has had. Mrs Graham certainly isn't happy that her mother has decided to leave; but then how do you argue with your mother, particularly if she doubles as a financial controller?

In fact, this matter of staff retention is one that is very much to the fore in Mrs Graham's management philosophy. The other side of this coin, staff selection, is therefore just as important and Mrs Graham places great store in making the right decisions. In consequence, the company's staff selection prowess is of necessity fairly studied, and moves are made with a certain managerial dignity.

Mrs Graham says that she has approximately 175 outlets for her company's products in Australia, with a further 500 odd occasional buyers. With the projected move into book publishing this list of outlets will increase in numbers.

With all that, Mrs Graham's claimed nervousness becomes even harder to understand. The Press folded one of its heads, sheathed its claws and lowered its lips over its fangs and left.

Walking away from the meeting the Press recalled Mrs Graham's sharply logical thought processes and warm sense of humour. She is not your usual American head of a local subsidiary, as her son is an Australian child and she is a permanent resident, there are very few earth-quakes here and lots of good business.

Frank Linton-Simpkins

Dialbase directory now on line

High Technology Computer Systems has announced that its free dial up directory is now online for testing from December 1 on (03) 429 1721. During the initial testing period, the system will be available only after business hours (single line only).

The system provides the latest information on

IMAGOMAT 1079

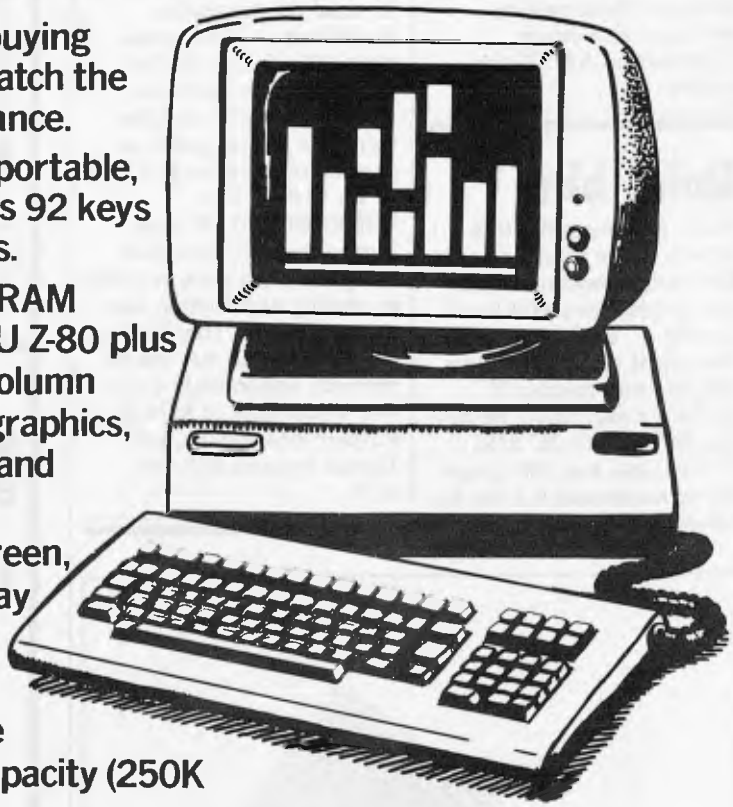
At last, the first joystick that puts the firing button where it should have been in the first place.

Now available from your Computer Dealer.
This unique durable joystick is compatible with any Atari VCS, Atari or Commodore computer.

Dealer enquiries welcome.

50 Clarence Street, Sydney.
Telephone (02) 29 6330

The incredible BVP 6400.



You could spend a lot more buying a personal computer and still not match the BVP 6400 for professional performance.

The Keyboard is completely portable, ergonomically designed and features 92 keys (standard ASCII) and functional keys.

The CPU Unit delivers 64K RAM (Expandable to 128K), has dual CPU Z-80 plus 6502 processor and an inbuilt 80 column display with soft switch plus color graphics, 2 disk driver ports. Runs on CP/M and Apple software.

The Monitor features a 12" green, non-glare CRT high resolution display screen. It will swivel 360° and can be tilted to the angle that suits you.

The Disk Drives are slimline designed and give 500K storage capacity (250K formatted storage each).

At $2,395* no other personal computer can hope to compete.

Special Bonus Offer. You will also receive the Business Master Accounting Package, valued at $650. (Valid while stocks last).

Total After Sales Care. We will give you all help possible to use and understand the BVP 6400. Just ask, we'll be there.

*PRICE DOES NOT INCLUDE SALES TAX

CP/M IS THE REGISTERED TRADEMARK OF DIGITAL RESEARCH.
APPLE IS THE TRADEMARK OF APPLE COMPUTERS.

BVP

The personal computer company.

Suite 27, 456 St. Kilda Rd. Melbourne 3001 Victoria.
Tel: (03) 267 5450.

PRINTOUT

Commodore hardware and software, plus special interest bulletin boards, electronic shopping, a software bank for downloading and more.

The system protocol is full duplex, standard ASCII, with 8 bits, 1 stop bit, no parity, 300 baud. Once on-line, users may also select "Commodore ASCII" for graphics etc.

Quick bits

We're short on room this month, so the following are the briefest mention of bits and pieces that might be of interest . . . BVP announce a new rental service for home and business micros. If you're not sure about buying ring BVP on (03) 267 5450 . . . Dicker Data has DR Graph (we've mentioned it a fair bit before in *APC*) on its Vector 4 micro. The package works in conjunction with CP/M-86 to produce business graphs and charts on screen or on a plotter or graphics printer. Dicker Data is on (02) 525 2122 . . . Forth is now available on the COMX 35. And the Australian distributor is offering two deals. The first is six free programs with the basic machine for $299 and the second is ten programs, a cassette recorder and COMX 35 for $359 . . The MICROSPOOLER from Tomas Systems frees your computer from slow printing by storing and feeding data to your printer. This buffered printer interface has 16k of memory, expandable up to 64k. Prices start at $374.00. Further information, call Tomas Systems (02) 438 4233.

Kyocera, the Japanese firm responsible for the Tandy Model 100 and NEC 8220, seems to be having a ball. First we see with great excitement the wonderful Tandy machine (one of which we bought), then NEC announces their version of the same basic product (see Printout, October APC) and now, it appears, Kyocera has flogged it again — this time to Olivetti. Olivetti calls it the M10 and sells it for $995.

NEW PRODUCTS

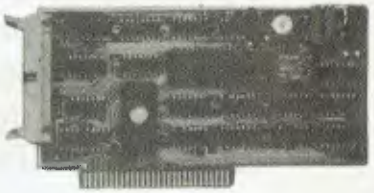
PEACH POWER

NEW DISK CONTROLLER BOARDS

The RC1802 and RC1806 have been developed in Australia using the latest DISK CONTROLLER TECHNOLOGY and have many advantages over the Hitachi Types.

RC1802 **$280 inc**

- Runs any standard 5" drive (Single or Double sided)
- Runs double density HITACHI DOS
- Now Runs MP3540 drives as double density



PEACH POWER

SOFTWARE BREAKTHROUGH

FULL FINANCIAL SOFTWARE PACKAGE

DEBTORS, CREDITORS, STOCK CONTROL INVOICING & GENERAL LEDGER

TRUE PROFESSIONAL QUALITY DESIGNED IN AUSTRALIA

$750

THE LOT INC TAX

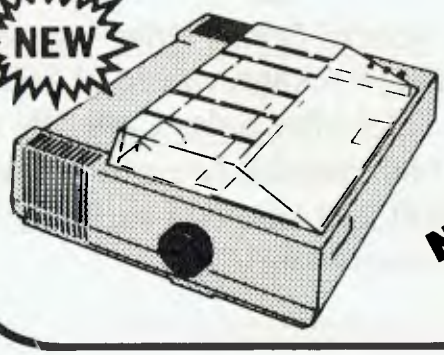
ON CONSTANT SALE

(DUE TO POPULAR DEMAND)

COMPUMATE PRINTER CP80

Compatible with Epson FT type III

NEW



$450 EX

INCLUDES CABLE

NEW LOW PRICE

QUOTE THIS AD.

FROM ROBS COMPUTER CENTRE

SUPER SD DRAW

EXAMPLE OF GRAPHICS PRINTING ON CP-80

MORE POWERFUL THAN ANY OTHER GRAPHICS PACKAGE ON THE PEACH
ABLE TO SAVE HI-RES SCREENS ONTO DISK, WITH A SIMPLE COMMAND
LOOK, PRINTS OUT ON PAPER
IS IT $1000
IS IT $500
NO, IT'S ONLY **$34.50** inc tax

AT LAST!

THE RC-Z80 CPM CARD FOR THE HITACHI PEACH IS HERE

NEW

$475 EX

- Uses Z80A CPU — 4MHZ
- 64K RAM on Board
- No Modifications to PEACH
- CPM Licence + Manual inc.
- Normal Operation of PEACH Unaffected

Please Phone or Write for further information

ALSO AVAILABLE FROM

S.A.	Metropole Adelaide	(08) 223 5538
NSW.	Computer Innovation Sydney	(02) 922 1608
NSW.	Computer Spectrum Wollongong	(042) 271 666
VIC.	Robs Computer Centre Dandenong	(03) 791 2900
W.A.	Office Update Perth	(09) 325 3499
QLD.	The Data Professionals Brisbane	(07) 369 6888
QLD.	South Coast Computers Miami	(075) 354 377

NOW ONLY

$995 ex tax

The home computer that genuinely grows with you.

HITACHI PEACH SPECIAL
Please Phone for Further Details

Hitachi 16002

- 16 Bit 8088
- 128K RAM
- 192K Video RAM
- Dual DS/DD 5" Drives
- Printer & RS232 Ports
- Full Colour

THE HITACHI 16002 NOW COMES WITH:—

PERFECT WRITER — Word Processing
PERFECT SPELLER — Spelling Checker
PERFECT CALC — Spreadsheet
PERFECT FILER — Data Base

$4977 ex tax
With HITACHI Hi Res Green Screen

DEBTORS	— Fully Integrated
CREDITORS	— Fully Integrated
GENERAL LEDGER	— Fully Integrated
STOCK CONTROL	— Fully Integrated
INVOICING	— Fully Integrated

$5095 ex tax
With KAGA II Hi Res Colour

WORTH OVER $3000

$5695 ex tax
With HITACHI Hi Re Colour

BROTHER HR15
DAISY WHEEL PRINTER

SPECIAL
$725 ex PARALLEL
$395 ex SHEETFED
$295 ex KEYBOARD
$165 ex TRACTOR

robs COMPUTER CENTER

We'll put you in touch with the best brain in the business

295 Thomas Street,
DANDENONG, 3175 Phone: (03) 791 2900

COMMUNICATIONS

APC welcomes correspondence from its readers but we must warn that it tends to be one way! Address letters to: 'Communications', APC, P.O. Box 298, Clayton, Vic 3168.

Cause and effect

Martin Banks' reply to Martin Perry's letter on the subject of video games deserves comment.

Martin Banks insinuates that video games encourage aggression. They do not. Aggression, or the desire to be best, encourages video games. If there were no aggression in humans, then video games would never have sold. If humans did not want to prove that they were better than each other, then there would be no video games.

Video games are, in essence, no different from any other game. Monopoly, pinball, football, chess, missile command: all contain elements of aggression, and all are designed to increase self esteem.

If a game can ameliorate aggression in humans, then it is better done in that context than against society.

Steve Rewey

(. . . an effect can become a cause, reinforcing the original cause and producing the same effect in an intensified form and so on indefinitely. A man may take to drink because he feels himself a failure, and then fail all the more completely because he drinks. George Orwell, Politics and the English Language — *Ed.)*

Basic challenge

While browsing through your readers' letters column 'Communications', in the October issue of *APC*, I came across a letter from R G Silson who gave a sample of a short Basic routine (which he uses as the main body of most of his own programs), and challenged Pascal programmes to write it more efficiently.

My first reaction was to grunt and go on to the next letter, but I then realised that Mr Silson was putting forward a reasonable argument. Why not try to answer it?

I have been writing in Pascal for several years now and consider myself (at the risk of seeming big-headed) rather good at it, although I did not even attempt to rise to the challenge set.

And why not if Pascal is so wonderful and I'm so good?

The main reason is that I could not for the life of me make head nor tail of the Basic routine that was provided — I simply found the example chosen to be totally unreadable to me, except that I understood its purpose was to control the logical flow of a program (and that only because of the accompanying letter). This is not because I am ignorant of Basic. I programmed for several years in Basic before turning at last to Pascal. It seemed to me from the arguments put forward in his letter that Mr Silson was missing the point of languages like Pascal entirely.

A structured program (believe it or not), is *not* the object of the exercise when writing in Pascal. Structured programming is a recipe for an end product which has more measurable benefits — the most obvious of which is readability by anyone accustomed to Pascal. I would be very interested to find out what percentage of even the most hardened Basic programmers were able to understand what Mr Silson's routine was doing.

Next point is the amount of dependence that a particular routine has on a host program. I counted a total of 13 variables used in the Basic example — all of which are available to the whole of any program in which this routine is incorporated. This, to my mind, is a recipe for disaster since even a small bug in a large program could have terrible consequences if it affected the value of any of these variables. In Pascal it is possible to declare what are called *local* variables — i.e. variables that can only be affected by the routine which creates them. This makes bugs of the type I have just described (along with a host of other similar catastrophes), virtually impossible in a well structured program.

Next comes the discussion of compactness and its effect on program execution speed. This argument is not really relevant to Pascal and other compiled languages since the readable text of the program (called the 'source'), is not what is actually run by the computer. Pascal programs are normally 'compiled' into machine language before being run. This means that no matter how wordy the source is (within reason), the program will still go like a rabbit with its tail on fire, after all, machine code is machine code whether from a compiler or written by hand. This means that Pascal programs can be made as wordy (or readable) as you like and you *still* get the benefits of compact code, a thing impossible to achieve with interpreted languages like Basic.

I would be willing to bet that if Mr Silson could explain to me what his routine is doing I could write it in a more 'wordy' way as he puts it, and still be confident that it will run many times faster than his Basic equivalent. He could of course improve his speed by rewriting his routine in machine language — but this only helps to prove that Basic is inadequate for his needs.

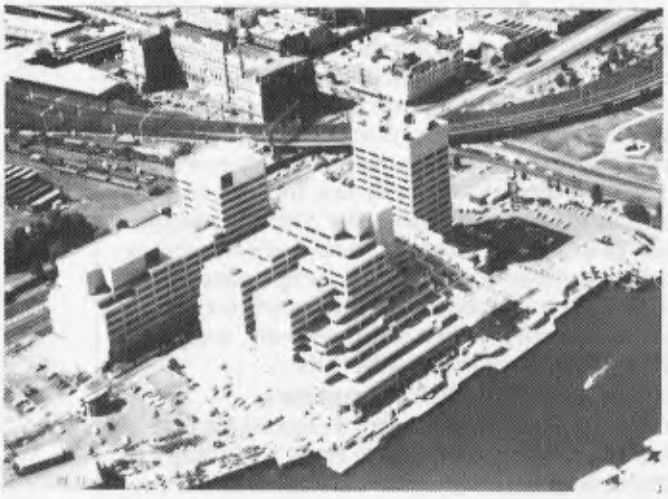
None of this means that I would do away with Basic altogether, since it is quite useful for short programs where execution speed and maintainability is not of the essence. It could also be useful for testing the logic of complicated algorithms before writing and compiling in Pascal — the interactive nature of most Basic systems has many advantages here.

As an introduction to newcomers to the art of programming it is also quite good, a point where my personal opinion differs from many Pascal buffs.

However, when writing code for large or serious projects there is really no competition between Pascal and Basic — only between Pascal and other similar languages. There is a good reason why almost no 'professional' software companies use Basic after all.

Finally, I would like to encourage everybody to have a go at Pascal. Buy a compiler if you can afford it, or simply learn the language if you can't. I would be more inclined to listen to arguments against Pascal from someone familiar with the language than someone who has only heard tales about it. But either way it can improve your programming skills enormously — opening wide new areas of understanding about computers (even if you stick

MAKE AN EXHIBITION OF YOURSELF...



Where? At The 3rd Australian Personal Computer Show World Trade Centre Melbourne.

This will be the first time you have the opportunity to participate in the largest specialised microcomputer show in Melbourne.

Four days provides you with more selling time and more time to be a part of the current microcomputer revolution.

With many of the largest computer companies already participating the benefit of securing your place in this show is obvious.

Discount admission to special interest groups, free admission to the trade and $4 admission to the public. Free seminars and free catalogues for all visitors.

Phone Fleur Michael now to secure the best possible choice of sites and your place in the future of the microcomputer industry.

Organised by Australian Exhibition Services Pty Ltd in association with the London based Andry Montgomery group, the largest specialist exhibition organiser in the world.

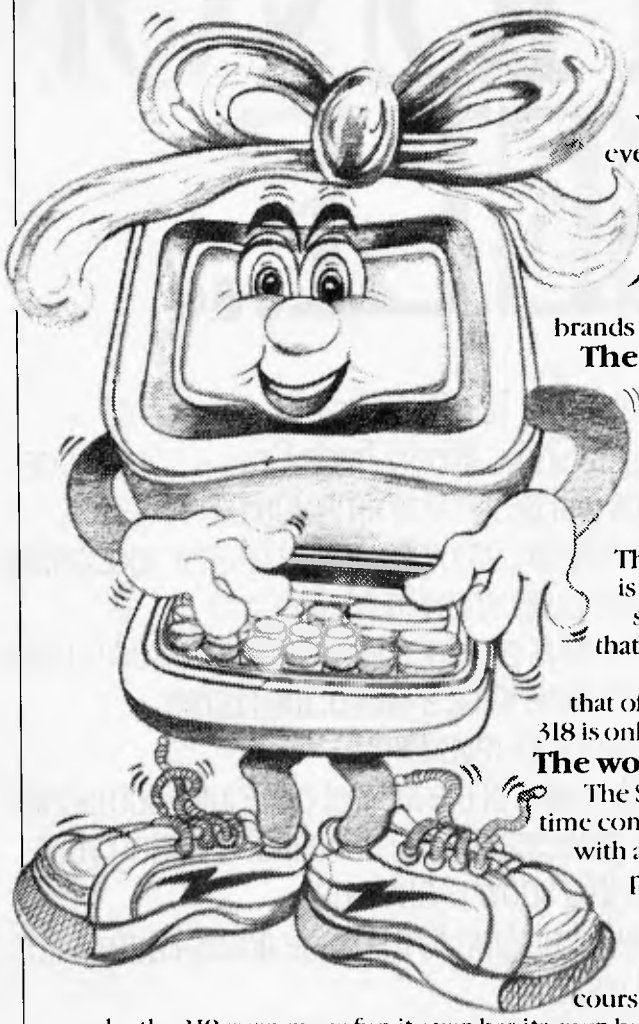
Further details:

aes Australian Exhibition Services Pty Ltd
1250 Malvern Road Malvern Victoria 3144
Telephone (03) 20 1208 Telex AA39329

PC 84

The 3rd Australian
Personal Computer Show
World Trade Centre
Melbourne
18-21 July 1984

This Christmas don't buy your children a present, buy them a future!



Your children are the most precious investment you can ever make. They are also the most expensive. So it makes sense to give them the best possible start in life.

And in 1984 that means making sure they know how to handle a computer. Because only the computer literate will make it in the decades to come.

But aren't computers expensive? And with so many brands to choose from which one should you invest in anyway.

The Spectravideo Computer.

Home computers in many respects resemble Hi-Fi. On the outside they all look much the same. It's what's inside that matters. And that's where the astonishing Spectravideo Computer comes into its own, because Spectravideo Computers are the most powerful systems in their class. To begin with, unlike the Commodore VIC 20, The Tandy TRS 80 and the Sinclair Spectrum, the Spectravideo is capable of almost infinite expansion. The 318 for example starts with 32K of Read Only Memory. And that's over twice that of the Spectrum and four times the more expensive Tandy.

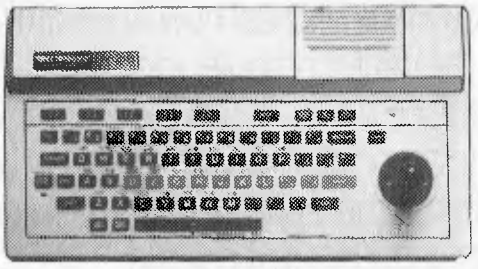
What's more it can be expanded to 144K which is twice that of the Apple II, which is almost five times as costly. And the 318 is only half as powerful but as versatile as the 328.

The world's most understandable computer.

The Spectravideo Computer System has been created for first time computer users. Using CP/M and Microsoft Basic and complete with a comprehensive do-it-yourself manual the Spectravideo is probably the world's most understandable computer!

Work. And Play.

There is an infinite variety of programs available for the Spectravideo. Educational, scientific, financial and of course there's a range of games–including Coleco Vision. And to make the 318 even more fun it even has its own built in joystick.



The better computer company.

Spectravideo Computers are distributed throughout Australia by Videoactiv Electronics, one of Australia's most professional computer companies.

Just $399.

Yes! The powerful, versatile Spectravideo range of computers from Videoactiv Electronics costs from just $399. So this Christmas don't buy your children a present, buy them a future.

Spectravideo
The world's most understandable computer.

See the amazing Spectravideo at your nearest dealer or ring Melbourne 537 2000, Sydney 328 1190, Brisbane 369 0496, Adelaide 211 7766, Perth 328 5299, Tasmania (003) 31 8551

Brand Management V.A 108

to Basic in the end).

Don Milne

Family fun

I felt I had to write to you to let you know how much our family enjoyed the Cross Figures puzzle and article in *APC* (June issue). My son showed us the article and as a family we had much fun in competing to work the puzzles out. They are intriguing and certainly get the 'grey matter' working. I do hope this will continue as a feature.

B Butcher (Mrs)

Tandy line feed

I have just purchased an 8k Tandy Model 100. While I am generally very pleased with it, when I connect it up to my Epson MX80 printer, all the print-out appears on one-line.

M Conneely

Your problem is one that is common to all Tandy owners. What has happened is that your printer is set up to expect a line feed (LF) code to be sent from the computer along with the carriage return (CR) code. The trouble is that Tandy computers strip out line feeds and only send carriage returns. This is fine if you use Tandy printers, not so good if you don't.

There are three ways that you can get around this problem:

1 Buy a Tandy Printer.

2 Manually insert a line feed in the text. This can be achieved by typing 'graph S' whenever you want a line feed to be performed. Although this works, it is not very elegant And having to remember to insert line feeds would be a problem.

3 Reset the DIP switches in the Epson. If you are willing to open the printer up, you will find a block of DIP switches. If you reset switch 2 then the printer will perform a line feed whenever it sees a CR.

Peter Bright

Radix 50

The operating system on my school computer uses the Radix 50 code for internal data storage. Could you please tell me more about this code.

R Hagger

DEC computers use this method to hold tables of program symbols because by reducing the length of each element to match it makes table searching quicker, which is important in assembling or compiling, as well as minimising table space. In Radix 50 code, up to six characters from a set of 40 can be packed into a 32-bit computer word. This saves space compared with ASCII, which needs 6 X 7 bits for 6 chars, and so would use 48 bits of storage. The characters are converted as if they were digits of a number in radix (or base) 50 octal, so the symbol $L_6L_5L_4L_3L_2L_1$ *becomes the value* $((((C_6*50+C_5)*50+C_4)*50+C_3)*50+C_2)*50+C_1$, *where values are in octal, and the letters are converted to codes by the following table.*

Code C_n	*Character L*
00	*Null*
01-12	*0-9*
13-44	*A-Z*
45	*"*
46	*$*
47	*%*

Len Warner

What you see . . .

I would like to make the following comments regarding my Benchtest of the

YOUR FUTURE COMPUTER SHOULD BE :-

* AFFORDABLE
* EASY TO USE
* RELIABLE
* HARD WORKING

OURS ARE!

CHECK THE RANGE :—

KAYPRO II

COLUMBIA

DULMONT MAGNUM

MORROW Micro Decision

All of our computers come with a range of quality business software designed to get you going immediately

Approved dealer for President computers on the Mornington Peninsula

Peninsula Office Services P/L

Suite 1, 100a Young St.,FRANKSTON 3199

781 5899

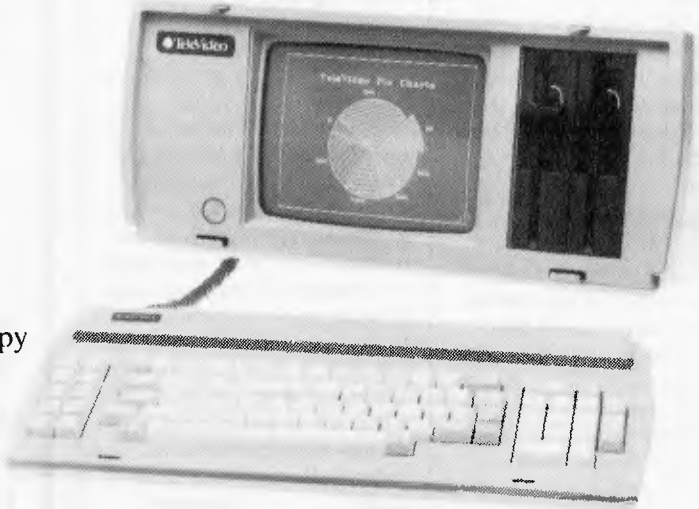
Serving the Peninsula since 1965

LOOK

NSW Public Service Board PREFERRED SUPPLIER

AT LAST! A quality portable at the right price!

That's right, a professional, quality portable at the right price – just look at the reasons why.



- A huge 9 inch High Resolution amber phosphor screen with 80 column as a standard feature.
- Two high capacity 500K slim line floppy disk drives.
- Integral ports for printer, modem and mouse.
- Detachable, low profile IBM-style keyboard.

The Televideo Professional Portable computer comes with all the software needed by the businessman on the move – CP/M® 2.2 Operating System with Digital Research GSX-80™ graphics extension, word processor, spreadsheet, business graphics and Teleasync® communications package.

Only Televideo can offer you a growth path – 64K of user RAM expandable to 128K with CP/M+® and an optional RS422 port to connect to a Televideo multi-user network system.

"Who else can offer you a portable with such a big future for $3445 including tax."

P.S. You should see the brilliant graphics!!

TeleVideo Systems, Inc.

For more information and the name of your nearest dealer, contact Data Peripherals Pty Ltd.
9 Avon Road, North Ryde NSW 2113. Phone (02) 888 5733
Victoria (03) 598 5111 Queensland (07) 287 1200 New Zealand (09) 49 1303

NEC APC and a letter published in Communications, Oct '83, from Jolyon Bone of NEC Information Australia which contained criticisms of my comments.

The purpose of a Benchtest is to evaluate a machine as it is supplied. This I did. If Mr Bone considers speed to be as important a factor in the worth of a machine as would seem to be the case in view of his letter strongly defending the speed of the APC and cites speed as one of the features of the machine remarked on by "independent technical commentators", then why was the machine supplied for the Benchtest running C Basic-86?

Steve Save

Unfair COMenX

Regarding your report on the COMX 35, we feel that some of your comments are quite unjustified.

Firstly, we can assure you that with the introduction of our monitor, Printer Interface Card (RS232 & Centronics) available in December, and the introduction of wafer & thermal printer early in the New Year, the Comx 35 will not need to be scrapped as you seem to suggest. We have already over 80 Software programmes available, which is far in excess of many other small machines, and all these have been introduced over the last three months!

You comment that not all colour combinations are allowed. This is deliberate, as other colour combinations have been deemed to be difficult to read. Further, we supply the units with a CO-AX plug as being an accepted standard. If your T.V. is non-standard, many adaptors are freely available to provide a suitable match.

You also found problems with the joystick. Surely you cannot comdemn the COMX 35 for sloppy typing? You then criticise the portability of Software on this machine. As most machines use their own particular dialect of Basic, and their own i/o structures, very little portability is supported by any computer company. Besides, despite the fact that there are many dialects in our own English language as with Basic, yet our communication is hardly impaired thereby.

Further, whilst you note that the 1802 is little known in the Hobby computer area, we must point out that it is used extensively in the Industrial control environment, where the low power cost of CMOS technology and high noise immunity is required. One can hardly condemn COMX 35 for using a processor chip used prodigiously by NASA in their Space Research programmes.

We would appreciate it if you could correct the error in your specifications section. The RAM used in the COMX 35 is in fact 35K, 32K being available to the User, and 3k being used for screen memory.

Finally however, we must agree with your statement that the Comx 35 represents good value for money, especially since we are offering Comx 35 plus cassette recorder, plus 10 programs (2 volumes) for only $359 for November.

Wallace Tang

Steve Withers replies:

Let me address Mr Tang's points in order.

On the matter of peripherals, it is sufficient to note that the expansion devices were not available at the time Mr Tang wrote his letter. I'm glad to hear about the programs that have appeared since the review.

The point about the colour combinations is reasonable, although there have been times when I have taken advantage of a computer's ability to use the same foreground and background colours to obtain a particular effect with a minimum of coding. As for the problem with the TV connector, I can only say that my set is a recent model from a "famous name" manufacturer. Since the article appeared, I have heard from several people who own VHF-only TVs, so they would face even bigger problems with a COMX.

I object to Mr Tang's remark about "sloppy typing". I maintain that the joystick is so close to the keyboard and so lightly sprung that there is a good chance of it being activated while typing.

There are degrees of portability. For example, I would much rather be given the job of converting a Tandy Color Computer program to run on an IBM PC than convert a program to or from the COMX.

I made no comment about the technical merits of the 1802 processor, I just described it as "unusual". I stand by that remark, and would ask Mr Tang how many books or magazine articles he has seen that give an introduction to programming the 1802. I wager there is a much larger number covering either the 6502 or Z80 families.

Finally, the COMX does not have 32k of memory available to the user. Approximately 2k is used by the Basic interpreter (presumably to store system information like the cursor position, start and end of program, etc), leaving about 30k for the user's program and data. The amount of user RAM available in the computers tested was determined by PRINT FRE(0) (or its equivalent), and rounding the result. The COMX was treated in the same way as all the other machines.

TANDY ELECTRONICS DEALER

TANDY COMPUTERS

TRS 80 COLOR BASIC
TRS 80 EXT. COLOR BASIC
MODEL 100
MODEL 4
MODEL MC 10

Free delivery throughout Australia.
90 day Warranty.
Bankcard & cheque orders accepted.

Bayne & Trembath
3 Boneo Rd., Rosebud, Vic 3940
Ph: (059) 86-8288, A/H (059) 85-4947
(TANDY DEALER 9320)

CREATIVE ELECTRONICS

INTRODUCING THE AMAZING VERSATILE HOME/BUSINESS COMPUTER

☆ ☆ ☆ *LIC-3001* ☆ ☆ ☆

Standard Features:
- Dual Processor (6502 & Z80)
- Runs Apple II & CP/M software
- Upper/Lower case
- 64K RAM
- Numeric keypad

Built-in
- 40/80 Column Output
- Printer Interface
- Disk Controller
- Function Keys

$995 (inc tax)

OUR STANDARD FEATURES ARE OTHERS' EXPENSIVE OPTIONS!

	LIC-3001	BASIS MEDFLY	FOX-640
64K RAM System Unit	$995	$1550	$1097
6502/Z80 (run CP/M)	+ 0	+ 0	+ 125
40/80 Column Display	+ 0	+ 0	+ 138
Disk Controller	+ 0	+ 110	+ 100
Printer Interface	+ 0	+ 0	+ 97
Function Keys	+ 0	NIL	NIL
Upper/Lower Case	+ 0	+ 0	+ 0
Numeric Keypad	+ 0	+ 0	+ 0
★★★ Total Cost ★★★	$995	$1660	$1557
WARRANTY?	12 FULL MONTHS	3 MONTHS	3 MONTHS

★ ★ All Prices Include Sales Tax ★ ★

FULL 12 MONTHS WARRANTY SPECIAL PACKAGE OFFERS AVAILABLE
DEALER ENQUIRIES WELCOME

Mitac Disk Drive for LIC-3001/Apple Computer $350
(Shugart Mechanism, with 2 years warranty)
Huge range of peripheral cards for your existing Apple System

Lowest Prices in Victoria

CREATIVE ELECTRONICS

(03) 544 5443 (03) 572 2406

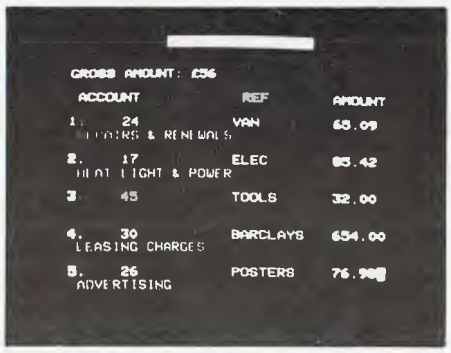
P.O. Box 148, Caulfield East 3145

Mail Orders Welcome at no extra cost

COMPUTERISING YOUR BUSINESS
PART 2 ~ SETTING UP

Jon Vogler tells a cautionary tale with lots of advice on using a micro to run your business. Applications include wordprocessing, accounting and spreadsheet.

Every year, about this time, I dump two hefty box files of incoherent records of my one man business on my tax accountant's desk. He turns white, protests that I need an archaeologist, not an accountant, but returns them a month later with a neat set of accounts on three sheets of paper, together with an alarming bill. This time, seeing that I was claiming capital allowances for a microcomputer, he asked, with a wistful look in his eye, 'Could you use it to keep your books?'



Financial summaries

So I invited him home to see my new business accounts program. By the time it reached the point where the cash payments report came spewing out of the printer, crisp, flawless and breathtakingly fast, he was caught. 'If some of my other clients could use that . . .' he said, and I saw in his eyeballs a vision of August and September spent on the Gold Coast instead of behind an adding machine in his dusty office. Then he added ruefully '. . . but our small business clients can't afford such a thing.'

I explained that it was not cost that would be the problem; my own installation cost under $7,000. The real difficulties were ... but perhaps I had better tell you them in detail.

Life and times

It is not coincidence that the use of computers in business started with the *big* companies; the ones with hundreds of customers, thousands of employees, tens of thousands of items in stock. Only they could benefit from the computer's ability to repeat operations quickly and economically. The small businessman or woman, (who from now on I'm going to refer to as 'he', but only for convenience), needs none of these economies of scale. He just wants help with the arithmetic of a small set of books and orderly systems in an office which is often only the kitchen table after supper or a corner of a leaky, noisy manufacturing shed.

Does the micro offer these? Can it wave a magic wand and free him from those tedious hours of bookkeeping after the weary working day has ended; the one part of the job for which he was never trained? Can it inject system and method so that debtors are called before they slyly go bankrupt and goods paid for that have actually been delivered? Above all, can it help him control his business: take action to prevent, not as a result of, things going wrong; know month by month what lines are profitable or whether his liquidity can stand that special piece of equipment that will

cut hours off a job but costs more than he expected?

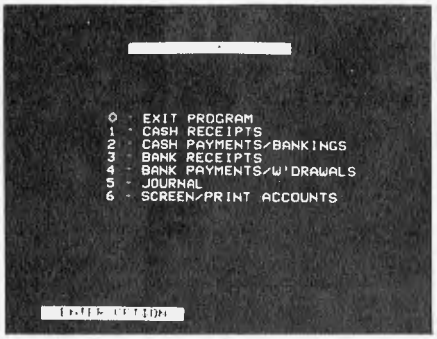
What the micro can do

The answer is a mixed one. The operations that he can realistically expect are as follows:

First, bookkeeping. The micro need not produce a professional set of accounts because the businessman cannot afford to sack his accountant, on whom he depends for tax advice. Instead an accurate, analysed summary, monthly as well as at the end of the year, will give valuable management information, reduce the number of hours the accountant spends crunching figures and sorting out confusion, and consequently reduce the latter's fee.

Second, economies on correspondence. Most business letters fall into a limited range of standard formats; all that varies is the customer and the details of the order. Word processing offers great advantages in this field.

Finally, all businesses, large or small, need good managerial control, based on a combination of realistic forward budgeting, coupled with up-to-date, factual information about progress against the budget.



Menu selection

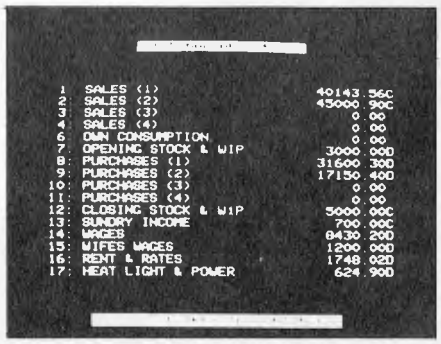
There are other matters, particularly stock control and the production of invoices and statements, that will also be of value but the three listed above are of overriding importance and will be considered in this article.

What hardware?

What basic equipment will be required? The central processor does not need large amounts of memory but word processing gets simpler the more that is available and spreadsheet programs are very memory-greedy. 64k is sufficient The keyboard must be of typewriter quality and a separate numerical keypad is an advantage.

Most data will be held on disk. Tape is too slow for the businessman and he is not short of the necessary (tax-deductible) cash to buy a double disk drive computer. So that he can keep standard software utilities and various workhorse programs in one and the data files in the second, without constantly switching.

A colour monitor is a disadvantage because, wherever the machine is located, children or employees are liable to play Space Invaders. Even in restful green, recommended to ease the operator's eyes over a full working day, there is a danger of meddlers wiping the whole year's books off a disk. Of course, this risk can be offset by triplicating all disk files and this is another reason for having a dual disk drive, which makes disk copying fast and effortless.



Cash flow

The most difficult choice will be the printer. If letters to potential customers are part of the selling process, as for a freelance writer, an architect or an interior designer, then a letter quality printer, with a daisywheel is essential. If correspondence is only for invoicing and general customer liaison, as in the case of a scrap merchant, a carpet cleaner, or someone running a dog kennel, then a dot matrix printer, faster and cheaper, will suffice. The printer is the item most likely to go wrong so those with a daisywheel may purchase a cheap dot matrix printer as a backup.

Finally, an old desk, fitted with a four-way electric socket, sawn to accommodate these items and hide the cables while still leaving space for jotting pad and table lamp, can be far more efficient, if less prestigious, then an expensive console from an office automation dealer.

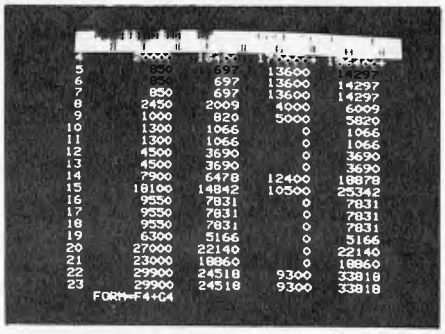
Software?

What software is available and can help the small businessman do the tasks described above? I shall illustrate with software for a well known CP/M microcomputer that has three models each with different disk capacities and each bundled with a number of software packages. The choice of CP/M is due to the vast amount of software that has been written for this operating system. The majority of the sixteen bit machines today are running 8-bit software – the main advantage of the 16-bit machines is their larger memory capacity (useful for those particularly memory hungry spreadsheets mentioned earlier). The operating systems of the new 16-bit machines are new and hence the consumer (is that you) is the testing ground. So study the benefits and drag out your old *APC* magazines – there is a wealth of good articles to be scanned.

Spreadsheet programs

Budgeting and forecasting probably prevent more crises than any other managerial technique. Plans of monthly activity are made years ahead and actual performance regularly compared with the plan. 'Variance' is easy to spot and its likely effect on the whole business calculated before, not after, damage is done. If he has budgeted and warned his bank manager that he will need an overdraft, the businessman stands a much better chance than if he wakes up to find a peremptory summons about his overdraft in the letter box.

Many activities can be covered. Use of manpower can be broken down by



Spreadsheet display

different skills, by cost centres or age or sex. A haulier can plan his vehicle utilisation, analysed by type or tonnage or depot. A sales team can lay out its targets, by product, territory or type of market.

The budget expresses such plans in financial terms, comparing wages and salaries, rent, insurance costs, raw materials, power, and a wide variety of other costs with the sales income they produce. Not only can it show the likely profit or loss at the end of the coming year, but also cash flow: the vital blood supply by which businesses live and whose short-term failure has often caused their downfall.

Why does every business not plan in this way? Because these techniques take many, many man-hours and once done,

The Affordable Personal Printer

Sleek, stylish, clean, professional. Introducing the SPIRIT from Mannesmann Tally. SPIRIT features professional print quality, advanced paper handling, and programmable print formats—all at an amazingly affordable price.

There's also an amazing option.

It's Quietpak, our unique sound absorbing package that smothers printer noise. At Quietpak's 52.5 dBa, SPIRIT barely whispers. It's quieter than an average typewriter by far.

SPIRIT prints everything from the simplest memo and billing statement to the most complex business proposal—complete with italics, boldface, underlining, superscripts and subscripts. Even bar charts and graphs.

With a little help from the SPIRIT, the personal computer will soon become the most useful machine in a professional's office.

SPIRIT can be interfaced to most personal computers, including:

- **Apple® II, IIe**
- **Compaq™**
- **IBM® PC, XT**
- **Kaypro®**
- **Osborne®**
- **TI® Professional**
- **TRS®**
- **Victor®**

SPIRIT is designed to work with most popular application programs, including:

- **dBase II™**
- **Easywriter™**
- **Graph 'n' Calc™**
- **Lotus 1-2-3™**
- **Multiplan®**
- **Visicalc®**
- **Wordstar®**

Special Offer
$395 + tax

MANNESMANN TALLY

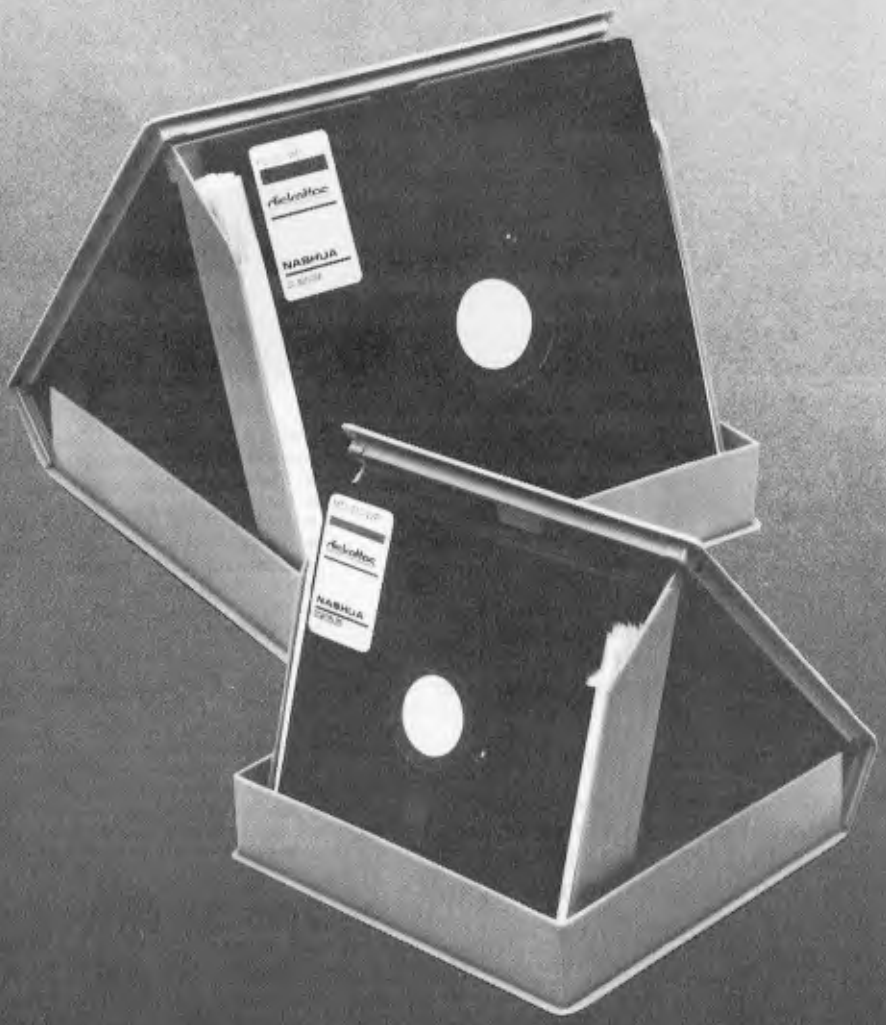
Reseller Enquiries Welcome

ANDERSON DIGITAL EQUIPMENT PTY. LTD.

ADE

P.O. BOX 422, CLAYTON, VICTORIA 3168, AUSTRALIA. PHONE: (03) 544 3444. P.O. BOX 341, PENNANT HILLS, NSW 2120, AUSTRALIA. PHONE: (02) 848 8533. Adelaide: 46 4062. Perth: 387 6055. Hobart: 34 4522. Canberra: 58 1811. Brisbane: 352 5788. Newcastle: (049) 69 6467. Wellington: 69 3008. Auckland: 59 0249. Christchurch: 483 991. Darwin: 81 5002. Singapore: (65) 449 4433. Bendigo: (054) 42 4322. Wangaratta: (057) 21 6443.

"Quality Circle" Diskettes



NASHUA

Computer Disc Division

Sydney: (02) 439 5966, Melbourne: (03) 428 0501,
Brisbane: (07) 369 4244, Adelaide: (08) 42 0021,
Perth: (09) 325 5722, Darwin: (089) 81 6204,
Auckland: 33193, Port Moresby: 21 2277

need to be recast perhaps time and time again to match changing policies or circumstances.

Usage

A micro program to lighten such toil is a spreadsheet. It sets out a table of columns and rows into which the user can enter text or numbers. It allows him to alter the width of columns, to define how each entry is spaced and to use formulae to calculate any entry. The entire table can be recalculated either as required or whenever an alteration is made.

I can recall innumerable conversations when the managing director said to the finance director: 'Go away and see what happens if we reduce the cost of that and increase the sales of these.' The finance director would shuffle out looking pained and, twenty-four hours later (if we were lucky), reappear with the altered document. Too many changes and he reached resignation point! A spreadsheet reduces this exercise, once the basic budget is cast, to a couple of minutes and a wreath of accountant's smiles.

Wordprocessing

Wordprocessing is fast becoming a standard software package included with computer systems available in the marketplace. In fact, for the first time user it can be a handy way in which to find your way around a keyboard as well as finding out the basic concepts of a computer.

Some users want to process long, complicated documents with cross referencing, footnotes, indexing and so on, others want to churn out personalized letters by the thousands, while others want special facilities like mathematical text. Many want to link their wordprocessor to some kind of data handling system – accounts, membership records etc. So one element in satisfying the customer is to match the requirements to the package. There seem to be four crunch areas: straight forward text, tables, long documents needing footnotes etc, and applications using repeated information like circular letters, contracts and reminders to debtors.

Wordprocessors – new and old – can basically be placed under two categories. Firstly there is the 'what you see while editing is what you get while printing' variety, for example WordStar, Micro-Script and Multi-Tool Word. The others (Spellbinder, Peach Text and Perfect Writer) separate editing from formatting. You can view on the screen the format as it will be printed, but you can't edit the text in that form. The result is that the first group tend to be more straight forward text and tables, while the second group tend to be more flexible for documents.

As usual, each package has its own strengths and weaknesses within these guidelines. I shall briefly outline two examples: WordStar and Perfect Writer.

Wordstar

For microcomputers running CP/M or MS-DOS, WordStar has been the market leader in wordprocessing software for some time. A major factor in its rise to the top has been its system of help screens that provide a full summary of commands. It is theoretically possible to learn how to operate the program without folding back the pages of the operator's manual, just by following the help screens, and many users have proven this. The help menus are structured around a system of prefixes that is intended to minimize the amount of memorization necessary for a novice.

When a file is being edited, the top third of the screen is filled with a menu of one-keystroke commands for frequent use – such things as cursor movement, deletion, turning the insert toggle on and off, reformatting paragraphs after editing, and so on.

A second level of menus shows screens of two-keystroke commands. This is where the prefix system comes Commands that begin with a Control 0 are used for on-screen formatting such as margin set and release, justification, centering, hyphenation, etc. Commands beginning with a Control K are for file and block moves like reading files into the current document, moving, copying and deleting blocks of copy, setting pointers, saving files, etc. Control Q commands are shortcuts – fast cursor movement, search-and-replace, deletion, etc. Control P commands control printing toggles. Finally, Control J provides an extended help utility for detailed descriptions of commands.

The menus can be turned on and off to suit the level of expertise of the user, but remain available (even though unseen) for easy access at a moment's notice.

Commands to the printer take one of two forms. "Dot commands", single lines that start with a period and a two letter abbreviation, control such things as top and bottom margins, page numbering and headers and footers. Embedded control symbols around words or sections indicate special effects like condensed prints or italics. Page breaks are represented by dotted lines which do not show up when the document is printed. Everything else, including margins, indents, line spacing and justification, appears on the screen.

Perfect Writer

Perfect Writer is based on a popular mainframe package, and exploits the separation of formatting and editing to the full. Features include cross-referencing (typing a reference to 'page nn' and leaving the system to fill in the value of the page number when known), true footnotes, indexing, and a wide variety of templates for different types of text format. These templates make it much easier to cope with 'structured' text.

Perfect Writer is capable of working on seven files simultaneously. By making use of temporary storage areas, known as 'buffers', the user can switch from one text file to another without having to close the first file, load the second, close the first file, so on and so forth. Perfect also utilizes a split screen feature: it is possible to look at (and edit) two files (or different sections of the same file) at the same time.

Buffers are also used to provide insurance against inadvertent loss of text. Deletions are temporarily saved, and a keystroke cancels the deletion. In fact, the Perfect buffer system is used for moving blocks of data. Rather than using a special sequence of commands to move a block from one location to another, you can erase the section and use the unerase feature (called "yank-back") to restore it at a new cursor position. This method is used to transfer chunks of text from one file to a second while using two windows into two buffers.

Perfect's commands are based on initial mnemonics, that is, the first character of a concept is used as the command. For example, Control F moves the cursor forward one character; Control E moves the cursor to the end of a line. "Larger" commands make use of the escape key, thus ESC-F moves forward one word and ESC-E moves to the end of a sentence.

Some users of Perfect Writer argue that it is easier for an experienced touch typist to remember the key words that indicate commands. However, those on the other side claim that location-orientated functions are more logical and easier to learn. In either case, inserting a command as you type interrupts your thought flow somewhat, and unless you are an awe-inspired keyboard whiz it probably won't have too much effect on your speed one way or another.

Another factor in 'ease of use' is the

SCOOP PURCHASE OF 2000 UNITS AMUST 80-DT

Australia's Largest Selling Printer

AUSTRALIAN DISTRIBUTOR
AMUST COMPUTER CORPORATION AUSTRALIA
350 South Road, Moorabbin 3189. Telephone: (03) 555 3644
MAIN STATE DEALERS

S.AUST	W. AUST	NSW	VIC	ACT	QLD
Emcasco Instruments P/L 99 King William Road, Adelaide Telephone: (08) 271 1839	Microbase Computers 422 Newcastle Street, West Perth Telephone: (09) 328 9544	Andy Stenberg 7 Arcadia Street, Coogee Telephone: (02) 260 1249	Compak Computer Shop 350 South Road, Moorabbin Telephone: (03) 555 9844	Computech Shop 7, Benjamin Way Church Centre, Belconnen Telephone: (062) 51 2525	Amust Computer (Qld) 2/6 Harvton Street, Stafford Telephone (07) 352 6355

frequency with which the product will be used. People who are using a system for at least part of every day, such as secretaries and full-time writers, will be more likely to tolerate a complex system that gives them plenty of facilities and/or speed, whereas casual users need a wordprocessor which is easy to remember.

Bookkeeping and accounts

There are many business packages available on the market for CP/M microcomputers. They vary from the sophisticated to the very simple, with the prices varying from $700 per module down to $100 a module. The same philosophy exists here as with any product that one might purchase – you usually get what you pay for. As my space is limited I will outline some of the more important things to look for in bookeeping and accounting systems, and in the next month's *APC* I will go over several of the systems available on the market.

Before you know what to look for you must have a general idea what you want the system to do. Firstly do not think that the computer is going to alleviate you paying your accountant once a year. What he charges you he will save you and if this does not occur, find another one. Secondly there are a number of systems on the market that are clones of a discarded system from one of the leading software houses. A reputable software house will not discard an old system unless there are fundamental errors in the design.

Find out about the warranty on the software. Some systems have a three month warranty and then an annual maintenance charge. Others have the three month warranty with no maintenance and a verbal assurance that they will answer any problems. That is worth about as much as the paper it isn't printed on.

There are not too many systems that are purchased without some form of installation support. A half a day a module is sufficient in the first instance with some form of later-day hands-on assistance – to help bring it all together.

Make a distinction between Bookkeeping and Accounting. The two are quite different even though from the small businessman's point of view they are the same animal. The same applies in the area of stock control and stock detail. Stock control is where we are actually dealing with minimum, maximum and re-order quantities. Stock detail is where we have the information on the stock item – information like the number, the description and the price. Stock detail is essentially used for invoicing while stock control is used for monitoring stock levels. One important point here is that if you are relying on the stock control for accurancy it is not the computer that makes the mistake but the people around it. If the person responsible for stock is given a printout of what is in stock and his report says there are four so called widgets and he goes to the widget stock bin and there are only two – that is the last time he will believe in the system.

Drawbacks and difficulties

Initially the computer will use much more time than it saves. It may take months for the operator to get the best from it and the training of new staff will be even more burdensome.

Secondly, the time required for anyone who is not an experienced typist to input information is longer than filling in a pay ledger by hand. However, this will improve with practice.

Thirdly, and a big disadvantage, one is committed to the computer. If it breaks down, the whole office comes to a halt. This often means that a service contract is necessary and these are extremely expensive.

It is essential to run in parallel with the manual system, preferably for a complete financial year. Otherwise errors or the omission of vital information in the early stage may jeopardise the final accounts.

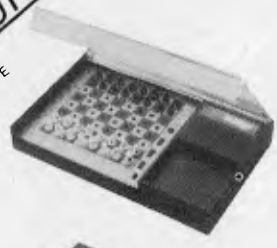
In big business data processing circles there's a motto 'Garbage in – garbage out'. To apply computers to business systems, experienced men would say, 'Order your computer, do all the preparatory work on your office systems and then cancel the order for the computer'.

It is in the orderliness that the computer imposes on human muddle that some of the biggest gains are to be made. This applies particularly to the small businessman. Yet if this orderliness is not achieved, the fiasco of a computerised office system can be far more diastrous than any manual muddler could ever believe. Don't say I didn't warn you!

ANNOUNCING

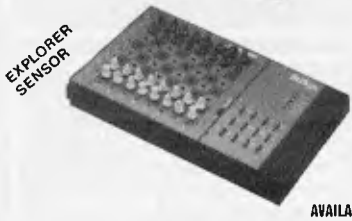
SciSys 1984 RANGE OF CHESS COMPUTERS

FIDE
EXCLUSIVELY ENDORSED BY THE WORLD CHESS FEDERATION

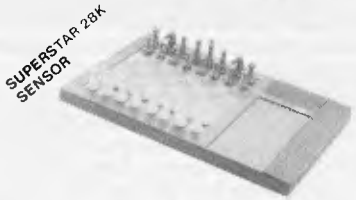


● WORLDS MOST COMPACT CHESS COMPUTER
●6 MONTHS ON AA BATTERIES
●REMEMBERS POSITIONS UP TO ONE YEAR
●IDEAL FOR TRAVELLERS

●VERY STRONG PROGRAMME
●FROM BEGINNER TO CLUB PLAYER
●CAN TEACH YOU TO PLAY CHESS
●FULLY PORTABLE 6 MONTHS BATTERY LIFE OR MAINS ADAPTOR
●EASY TO SET UP, VERIFY AND ADD PIECES



●VERY STRONG PROGRAMME
●FROM BEGINNER TO CLUB PLAYER
●CAN TEACH YOU TO PLAY CHESS
●FULLY PORTABLE 6 MONTHS BATTERY LIFE OR MAINS ADAPTOR
●EASY TO SET UP, VERIFY AND ADD PIECES



●WORLD BEATER 24 LEVELS
●FOR BEGINNER TO CHAMPION
●BATTERY AND MAINS
●MORE POWER AND FEATURES THAN ANY OTHER CHESS COMPUTER

AVAILABLE FROM ALL MAJOR DEPARTMENT, ELECTRONIC, GAMES AND VIDEO STORES THROUGHOUT AUSTRALIA.
AUSTRALIAN DISTRIBUTORS: COMPUTERPLAY SCISYS, P.O. BOX 69, GLEN WAVERLEY,3150.
PHONE: (03) 561 1078. TELEX: AA 30625 ATTN: ME 269.

IQ-150

THE COMPUTER WITH ABOVE AVERAGE INTELLIGENCE.

FEATURES:

* DUAL PROCESSORS; 65CO2, Z80
* 64K RAM
* CMOS 6502
* UPPER & LOWER CASE
* 12K ROM
* LED WARNING LAMP
* NEW STYLE CASING HOLDS TWO SLIMLINES
* DETACHABLE KEYBOARD
* 95 KEY, 24 PROGRAMMABLE
* FULL CURSOR CONTROL
* COLOUR GRAPHICS

Costs only $987-00

INCLUDING

SANDY WORD PROCESSING

&

A FINANCIAL PACKAGE

AVAILABLE FROM:

Emerald Hill Computer Brokers
294 Kingsway,
South Melbourne, Vic 3205
Telephone: (03) 690 8095

Computer Records
261 Wattletree Road,
Malvern, Vic 3144
Telephone: (03) 500 0659

Computer Edge Pty Ltd
364 Ferrars Street,
Albert Park, Vic 3206
Telephone: (03) 690 1477

Computer Edge Pty Ltd
229 Chapel Street,
Prahran, Vic 3181
Telephone: (03) 529 7622

CHECKOUT

THE EXECUTIVE 816

In these days of troubled computer companies following in the foorsteps of a failing Adam Osborne, it is indeed surprising to find another Z80/CPM based portable computer appearing in the market place. The Executive, however, is an Australian creation boasting a mountain of free software and outstanding functionality.

The Executive 816 strikes me as the type of machine that would appeal to the application – oriented buyers – the sort of people who would buy the machine purely to perform one or more specific tasks handled by the software which comes standard with the machine. This category of user does not care (and rightly so) whether the machine is 8 or 16 bits, and whether it runs CPM or MS-DOS. It is really only fanatics such as me who worry about such things. Let's face it – the time of the 8 bit CP/M Portable has been and gone, the current fashion is now 8086 MS-DOS based IBM compatibles. Although fashion may dictate what appears at the trade shows, fashion *does not* dictate what is useful and marketable.

The Executive is integrated into a briefcase, thereby eliminating the knowing nods when you board an aircraft and stow the machine under the seat. This is a real drawback of the Osborne and its clones – everybody *knew* that you were carrying a computer and hence there was no element of surprise when you opened it up and fired up visi-calc. The Executive, on the other hand, looks just like a normal briefcase and thus should cause no embarassment in transit.

Housed inside its subtle disguise lies a Z80 processor with 64K of memory, a 5" diagonal 80 x 24 screen and keyboard. The screen can tilt upwards to about 15 degrees, thereby eliminating the need to work with your chin on the desk. The screen is extremely clear and stable, but of course uses newsprint size characters, so despite the legibility of the display, still causes some strain when viewed for prolonged periods. To counter this, the Executive provides connection to an external 12" CRT for operation at home base. The keyboard is stored in the rear of the case, connected via a 24" spiral cable, thus allowing the user to position it wherever is comfortable. It includes five function keys which are normally used by application

Even humble QWERTY feels at home in Digital's brilliant Rainbow 100 keyboard.

Most personal computer keyboards have the familiar typewriter layout known as QWERTY. But there the similarity with Digital's Rainbow 100 keyboard ends. Because Digital have produced a masterpiece of design for you to communicate with their Rainbow 100 personal computer.

This keyboard is light enough to sit on your lap, so you can work in complete comfort. It's comfortable when you work on the desk, too, as the ultra-slim profile lets you type with your wrists resting on the desk-top.

A lot of research went into the layout of the Rainbow 100 keyboard to make every section logical and easy to learn. That's why it's separated into distinct groups of keys, including a very neat cursor control shaped like an inverted "T," because it gives a "natural" feel to the up, down and sideways movements of the cursor.

But the most important questions for any personal computer are: How much work can it do? How many applications can it run? And this is probably where the Rainbow 100 scores best of all.

Because Digital have incorporated a dual-processor design into the Rainbow 100's Central Processing Unit. So it can run not only the latest 16-bit CP/M™ and MS/DOS™ programs, but also a vast range of industry-standard 8-bit CP/M™ programs that have been tried and tested over many years.

Versatility like this is hard to match. Digital's warranty is hard to match, too. It covers you for complete maintenance for 12 months at your own premises.

Remember, when you buy a Rainbow 100, you're acquiring a personal computer with virtually unlimited potential. It is not restricted solely to "stand alone" use. It also has the capability to talk to other personal computers and mainframes. And when in the future you expand–your Rainbow 100 will expand with you. Right up to a total office network with worldwide communications abilities.

To find out more about Digital's Rainbow 100, phone the toll-free number (008) 226446. If you're in the Sydney Metropolitan area phone 412 5590. Or send in the coupon for details of your nearest Authorized Digital Dealer.

When you try our Rainbow 100 for yourself, we're sure you'll feel at home with it, too.

digital

So easy to work with.

Digital Equipment Corporation, Chatswood Plaza, Railway Street, Chatswood, NSW, 2067. I'd like to see the Rainbow 100 in action. Please send me details of my nearest Authorized Digital Dealer.

Name _____ Address _____ Postcode _____ Phone _____

programs as cursor control keys, with the fifth functioning as a "DO" key. Unfortunately, the applications generally do not also recognise the other cursor control keys, and so it is necessary to lift your palms off the desk in order to activate the function/cursor control keys – a minor point, but one that I found to be an inconvience. The keyboard also provides a full function numeric pad with cursor control keys – unfortunately, these cursor control keys are very rarely recognised by the software.

The Executive provides a centronics interface, serial interface and hard disk interface as standard. Dual 5" floppy drives are situated on the right hand side of the front panel providing a total storage capacity of 1.6 Mbytes. The left hand side of the front panel is the power supply, providing a reset button, screen brightness control, power switch and indicator. For usage out in the bush or down at the beach, an optional 12v car battery interface is also available.

Software

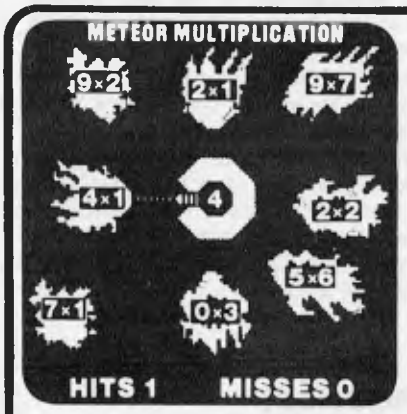
The Executive comes complete with more than $3000 worth of applications software and packages. The system runs CP/M 2.2, which is nicely hidden under a menu – a wise move if I am correct about its potential market. Applications can be chosen by simply moving the cursor to the desired menu selection and then pressing the "DO" key. Alternatively, a single letter may be typed to select an application. The menu not only provides access to the applications stored on the disk, but also to commonly used CP/M commands and utilities, such as disk directory, file maintenance, serial interface initialisation and the ability to automatically execute a command upon booting. The menu also allows you to use CP/M directly, should you feel the urge.

The software provided with the machine could best be described as "trojan". None of it is particularly clever or "state of the art", but all of it fulfils its function with the minimum of fuss. If you are thinking seriously of the Executive, I would strongly suggest that you try the software to ensure that it includes all of the functionality you require.

For the small business, a suite of IMS Packages is provided, including accounts payable, accounts receivable, inventory (stock control), and a general ledger, including profit & loss and a balance sheet. All of these programs do pretty much what you would expect, and may be applicable to a small business of ten people or less. Bear in mind, however, that just because your business may have more specialised accounting requirements, that does not mean that the Executive 816 is of no use to you – more than half a dozen applications are provided free of charge, and I think that your investments would be justified if any two or more of them could be put to use.

For those of us in the service industries, the Executive also provides a project costing package. This package budgets and monitors labour and non-labour costs for given projects. The package is functional, although its scope is severely limited. Once again, have a look at it, and if it does what you want then it is perfectly adequate.

Somewhat similar, but more useful, is OCAS, the office costing analysis system. Your various clients, staff and projects are defined to the system using code numbers, and then staff time sheets are entered to show who worked on what for how long and whom. The system can also handle the input of fixed (not time related) charges. The system can then show balance for each client for billing purposes. It cannot, however, show totals by staff or by task. Although this information is not essential, it could be very useful for management and control purposes.



DLM®

Maths & Word Games

A Fantastic Learning Experience

- Alien Addition
- Minus Mission
- Meteor Multiplication
- Demolition Division
- Alligator Mix
- Dragon Mix

Learning is easy when students are having fun. That's the idea behind DLM's Arcademic Skill Builders in Maths and Skill Builders in Language Arts.

Each of these twelve exciting and colourful educational software packages provides a highly motivational approach to learning. Unlike the other games on the market, these require that a child learn something useful while having fun. They also feature variable levels of difficulty, speed and running time. A child never outgrows DLM software!

DLM programs have been extensively field-tested. DLM's Language Arts games have all-Australian content. DLM is committed to quality. DLM programs have been highly praised time and time again in reviews in countless journals.

DLM Maths Skill builders available for the: • *Apple II/IIe* • *IBM PC* • *Commodore 64 (disk)* • *Atari (disk).*

DLM Language Arts Skill Builders available for the: • *Apple II/IIe.*

Available from your local software shop, or contact the Australian distributors, Dataflow Computer Services Pty Ltd, on (02) 745 3303, at 6-8 Elizabeth St, Burwood NSW 2134, for a free colour brochure and the address of a software supplier near you.

- Verb Viper
- Wordman
- Word Invasion
- Spelling Wiz
- Word Radar
- Word Master

CHECKOUT

THE EXECUTIVE 816

OCAS also has simple accounting functions such as ageing, cash receipts and statements.

A word processor is provided called Superwriter. Because of the probable market of this machine, I see it more likely that Superwriter would be used by the M.D. on his business trips rather than used by a secretary. The tool is certainly *suitable* for use by a secretary, but it would be very inconvenient for work to cease on a major document or report merely because the boss took the machine away on a business trip. Perhaps the solution is to buy two machines, one for your secretary and one to follow you around.

The Executive 816 also provides a "Membership system", which could be used to control your cricket club, client profile list, employees or business associates. It includes all the necessary facilities to add, update or delete entries, and also allows you to search based on various criterea, including phonetic name matching. The system is particularly useful for clubs and associations, as it provides the functions necessary for keeping track of dues.

For financial spreadsheeting, Multiplan is provided to assist you with your budgets and business plans. While Multiplan is not "state of the art" as far as a spreadsheet technology goes, it is certainly several steps ahead of the original visicalc and does have quite a "cult" following. This is yet another example of the sort of software chosen for the Executive, not the latest thing, but certainly a well proven product with a track record.

For other data-oriented applications, the Executive includes the ARM DBMS, a very rudimentary system which allows you to define your own files, add, delete and update data, and also reporting functions. The ARM "DBMS" is really no more than a computerised card index system and is certainly not a DBMS in the true sense of the word, but is probably adequate to replace any small card files you may use in your office.

Data communications ability is provided via two utilities, called transmit and receive. These two really only allow you to talk to another Executive, and so a potential application would be to transmit data (minutes of a meeting, spread sheets, etc.) from interstate back to head office, assuming you had an Executive in each location and had purchased some form of modem. The modem can be connected to the serial I/O Port provided with the Executive.

Other software provided with the machine allows you to read floppies from other common machines, including the DEC Rainbow, IBM PC, Kaypro, Cromemco and the Osborne. I did not have an opportunity to try all of these disk formats, so if you are planning to use this facility extensively, it would be best to take a foreign disk along to the Executive dealer and make sure that there are no problems in reading it. The foreign disk must, of course, be 5¼ inches in CP/M format.

Documentation

The documentation for the applications provided with the Executive 816 is more than adequate, handsomely packaged in black ring-binders. Documentation for the machine itself is, however, quite sparse, taking the form of a single pocket sized 70 page "instant". This document attempts to cover everything from how to care for a floppy disk through to serial interfacing. Predictably, it does not meet its objective of being all things to all men. When recourse to the manual was necessary for me, it did seem to have everything that I was looking for, so perhaps the manufacturers have done an outstanding job of restricting their manual to those things most commonly required. Of course, if the Executive does turn out to be an "application machine", then a highly detailed technical manual will not be required. The average Executive owner will be more concerned with how to use his application ware, rather than which FDC chip it uses. Presumably more detailed technical data is available upon request.

Portability

The Executive is being advertised as a "portable computer", but just how portable is portable. At the moment, there are three grades of portability available in the computer industry.

1. Moveable. A moveable computer is one that can be moved from place to place, but which usually involves lugging many heavy units around and reconnecting a host of cables. An example of a moveable computer is the IBM PC. You can certainly take it home at weekends, but you would only do so if you knew you had a lot of work to do with it.
2. Transportable. The Executive is a "transportable" computer in that it is no great hassle to pack it up and take it home. It is even no great effort to take it interstate. By comparison, taking a moveable computer interstate normally involves three to six boxes and air-freight.
3. Portable. My definition of portable is a machine that is so easy to move around that you would take it with you *just in case* it was required, and that you may even *forget* that you have it with you. These computers usually fit inside your briefcase, and do not have disks or glass screens, using LCD displays instead.

Obviously the power of the machine decreases with greater mobility, and it is really up to you to decide how often the machine is going to travel. If the answer is "sometimes" then something in the Executive's class is probably the best trade-off of power versus mobility. I would never take my IBM PC home, but there are times when I wish that I could just grab it on my way out and put it in the back seat of the car.

Conclusions

The Executive is an Australian design machine which will be manufactured in Moorabbin, Victoria by Amust Computer Corp. at the rate of 1000 per month. At a price of $2995 plus tax, and including over $3000 worth of software, its value for money cannot be doubted. I believe that the Executive has been very appropriately named, as it will probably appeal mostly to the executive market, and its overall design seems well matched to this area of usage. Even if only one quarter of its software is of any use to you, I think you will find that the Amust Executive is a very functional investment.

NEW

NEW! 10-ft RETRACTABLE CABLE

THE Champ #1 USA

$29.95

★ DOUBLE TRIGGER ACTION
★ ARCADE SIZE AND RESPONSE
★ SUCTION CUPS
★ RIGHT OR LEFT HAND USE

DEALER & DISTRIBUTOR ENQUIRIES WELCOME

NEW

$149.95

QUALITY DESIGNED IN DENMARK

LOWEST PRICED COMPUTER

★ 10K EXPANDABLE TO 58K
★ FULLY GUARANTEED

POWER 3000

DEALER & DISTRIBUTOR ENQUIRIES WELCOME

NAME.....
ADDRESS.....
.....
POST CODE..... PHONE.....

COMPUTERPLAY P.O. BOX 69,
GLEN WAVERLEY, 3150. PH: (03) 561 1078
TELEX: AA30625, ATT: ME269.

Please send me details.....Champ Joystick ☐ Power 3000 ☐
Please let me know my nearest retailerChamp Joystick ☐ Power 3000 ☐
Please mail me.....Champ Joystick ☐ Power 3000 ☐
Cheque/Money Order enclosed. Add $2.00 P. & P.

The Best Spot in town
for all your personal computing needs.

SPECIAL PACKAGE OFFERS

Commodore 64
Triga Command Joystick
Cassette Recorder
& 3 Ozi Soft Programs
$569

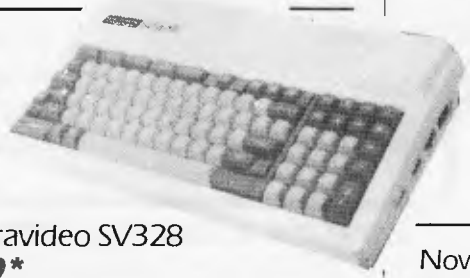
SAVE $80

VIC 20
Triga Command Joystick
Cassette Recorder
& 3 Ozi Soft Programs
$369

SAVE $69

NEW! The remarkable KoalaPad High-resolution Computer Graphics Touch Tablet from **$149.95.** Includes Software Package

Spectravideo SV318
$499*



Spectravideo SV328
$799*

NEW SOFTWARE JUST ARRIVED!

FOR COMMODORE 64

Zork. 1, 2 & 3	$25.00*
Kongo Kong	$24.95*
Home Manager	$39.95*
Master File	$39.95*
Underworld	$24.95*
Bridge	$24.95*
Choplifter (cart)	$64.95*

FOR VIC 20

Macpan	$19.95*
Cops & Robbers	$19.95*
Fly Snatcher	$19.95*
Mosquitoes	$19.95*
Curse of the Werewolf	$19.95*
Scramble	$19.95*

FOR ATARI

Strip Poker	$39.95*
Bridge	$24.95*
Monkey Maths	$29.95*
Draw Pic	$39.95*

Sydney's Largest Stockist of Commodore 64 and Vic 20 Software and Utilities.

HARDWARE

NOW AVAILABLE!
The new Atari 600XL (16K)
$399*

And the new Atari 800XL (64K)
$599*

Sinclair Spectrum from **$299***
With complete software range available ex-stock.

Now franchised agent for B.B.C. MICROCOMPUTER
Used by the ABC and recommended for use in schools in 5 out of 6 states in Australia

EXCLUSIVE

2X
Extended Warranty
Doubles the Warranty Period

The Computer Spot now offers an Exclusive Extended Warranty that doubles the warranty period on pre-tested hardware to ensure trouble-free operation.

*Recommended Retail Price

And so much more . . . from the spot with the lot in Home Computing.

the Computer Spot

Castlereagh Street Level MLC Centre, Martin Place, Sydney 2000. Tel: 235 2971

Gallery Level Eastgate Centre, Bondi Junction 2022. Tel: 387 5208

IMAGOMAT 202APC

SORT TREES FOR BEGINNERS

Following up his series on Warnier-Orr Programming, Paul Overaa now invites you to don your monkey-suit and swing through the branches of this commonly used data structuring technique.

Most of you will have come across the term 'data structure'. The ways in which we structure our data can make a dramatic difference to the efficiency and speed with which some applications programs will run. Stacks, lists, tables or arrays are examples of such structures that are commonly used by programmers and even novices soon acquire a certain proficiency and indeed a 'mental picture' of these concepts and the way in which they can be used.

'Tree Structures' are another very common way of describing and organising data and they have numerous possible applications. Trees get less exposure in the computing magazines than other data structures, possibly because they are considered to be rather complex. This is, to a certain extent, a misconception because in many cases the use of tree structures can actually simplify programs rather than complicate them.

I have avoided the temptation to provide you with listings of various tree routines that are in common use. Instead I have decided to tackle the problem right from square one. What I shall do is take you on a 'guided tour' around the type of approaches I used when I first encountered trees. In this way it should be possible to understand the basic concepts before getting involved with writing or trying to understand specific routines.

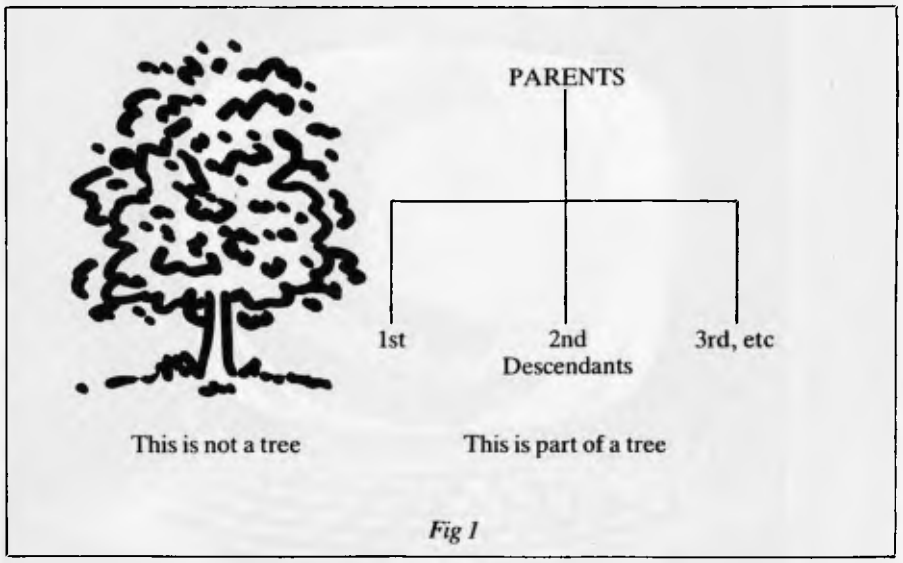


Fig 1

All of you will know what a 'family tree' looks like and will also know that by convention they are drawn upside down, ie, parents are shown above their descendants. Fig 1 gives the general idea and also attempts to confuse those of you that are gardeners.

When we draw a family tree we are attempting to describe the relations between the parents, their children, the descendants of those children and so on. The important point is that we are showing how various items in the tree are related. In a computing sense the data structure called a tree is somewhat similar and the terminology used will often reflect this.

Another common 'non-computing' example of a tree structure is a management organisation chart. Fig 2 is part of a typical example. Again the purpose is to show relations, this time between the various jobs or orders of responsibility within the company.

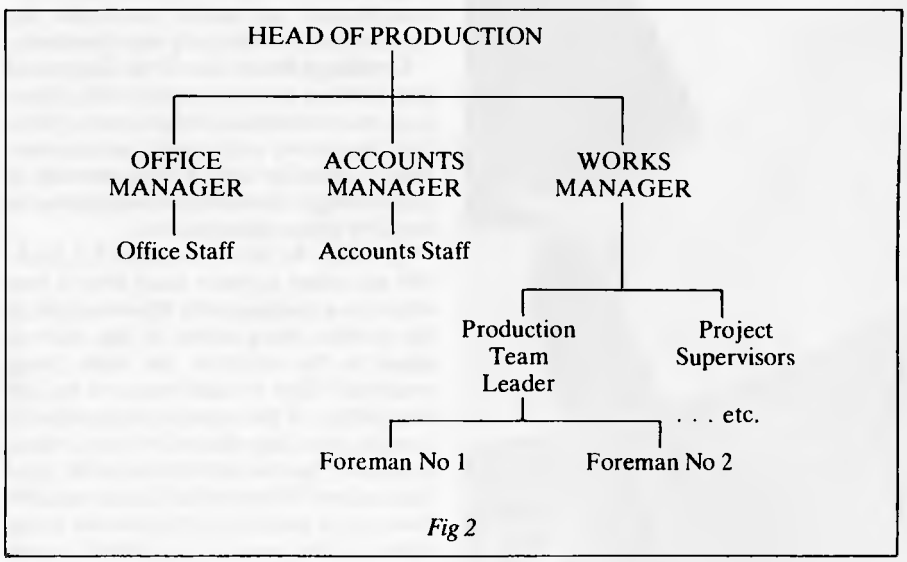
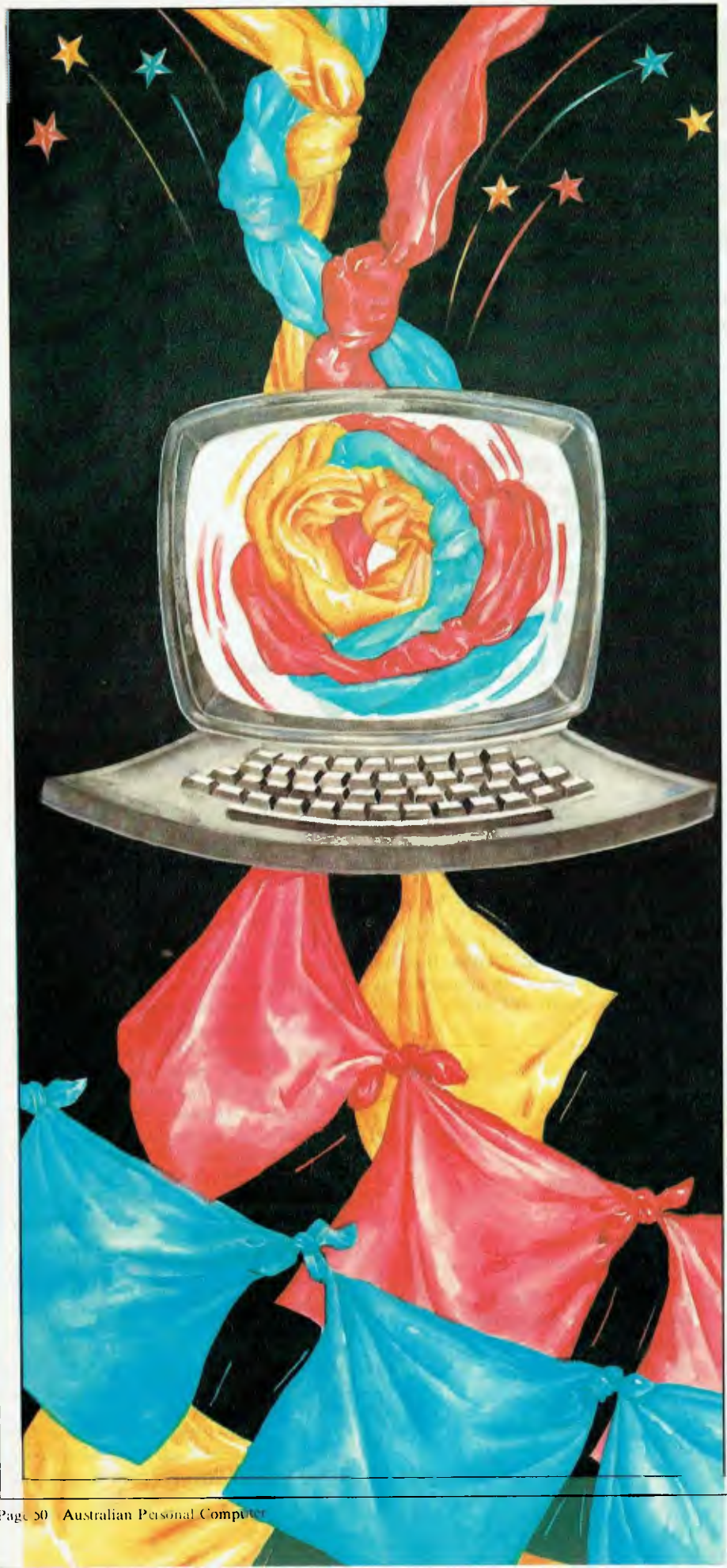


Fig 2

If you look again at Fig 2 you will notice several things. Most importantly each item on the chart is related to only one item above it. We say that each item has only one parent, ie, Foreman No 1 is responsible only to the Production Team Leader. Similarly the Production Team Leader is only responsible to the Works Manager.

There is no such restriction on the number of 'descendants' that an item may have. The Production Team Leader has



many Foremen who have to report directly to him.

In general then, for a structure to be classed as a Tree Structure, each item must have only one Parent but may have none, one or many 'descendants'. The exception to this is the very first item in the tree, this will have descendants but no parent. This first item is given a special name . . . the 'Root' of the Tree.

Before we start considering how these structures can be used in a computing sense we need one more piece of terminology. Each item in a tree is called a 'node'. Thus the first item would be called the 'Root Node' or 'Node 1'. It is helpful to number nodes in this way because it is then easy to discuss particular nodes of a tree diagram. It is then equally easy to find the respective node on the diagram itself.

Binary trees

It may now have occurred to you that one way of describing a 'list' is quite simply that it is 'a tree structure in which each parent is allowed only one descendant'. The simplest type of tree structure, other than a list, is one in which we restrict the maximum number of descendants a particular node may have, to two.

Such a structure is called a 'Binary Tree' and it turns out to be a very useful structure indeed. One application of Binary Trees is in the sorting and searching of large amounts of data. Since these applications probably occupy more computer time than any other single application, it is little wonder that a vast amount of work has gone into ways of creating very efficient routines. The complexity of these published standard solutions, many developed and refined over a period of years, tends to cloud the basics and make it extremely difficult for newcomers to come to terms with the more fundamental aspects involved.

By starting with fairly humble beginnings I hope we can avoid these 'apparent complexities' and enable you to see the benefits that exist in using such structures.

Creating a Binary Sort Tree. One prime use of binary trees is in sorting data. Since most micro enthusiasts find sooner or later that elementary sort procedures are absolutely useless for sorting large amounts of data I thought it would be of practical use to consider this application first.

Consider the list of numbers 5,3,1,6,4. We are going to place them onto a tree structure according to the following rule: if the number being added is 'less than or equal to the value of the node being examined' then we shall move to the left descendant. If the number being added is 'greater than the value of the node being examined' then we shall move to the right descendant. When we find that no suitable descendant exists then the number being added to the tree will be added in that

Proudly presents

Progressive Software Publishers

'LLAMASOFT'®

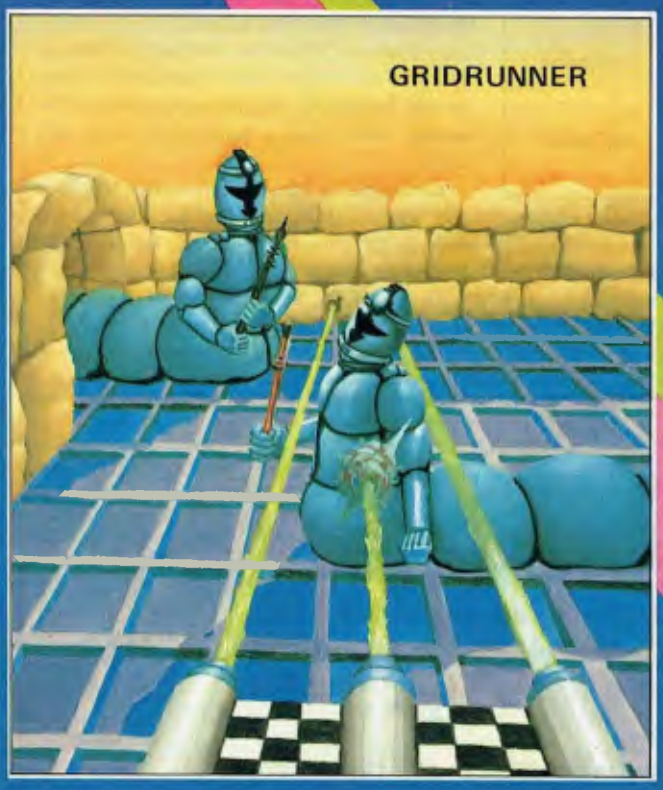
Computer Software

by Jeff Minter

For the **VIC 20** and **Commodore 64**

ON CASSETTE TAPE

Two of our most popular titles



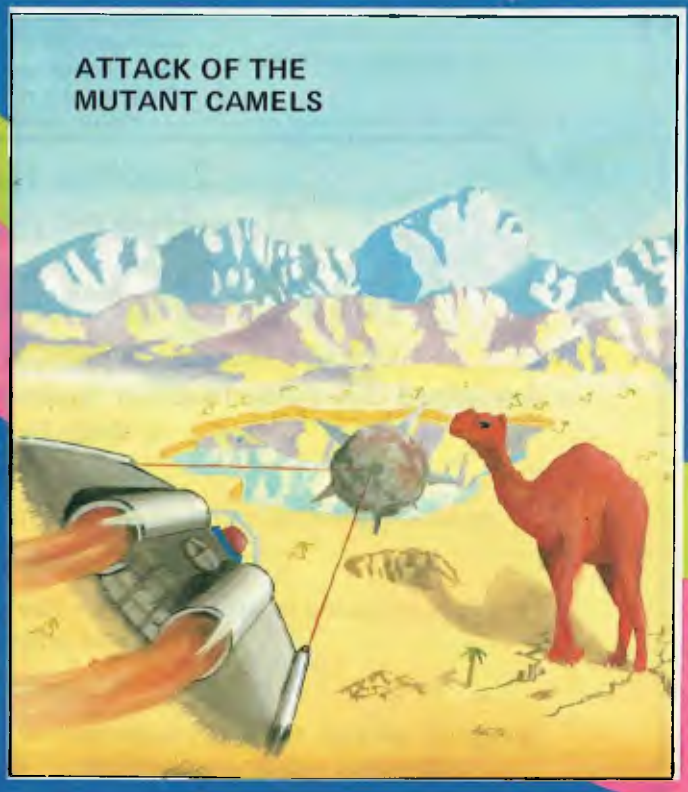
FOR THE VIC-20

Abductor	$19.95
Gridrunner	$19.95
Andes Attack (8K)	$19.95
Laser Zone (8K)	$21.95
Matrix (8K)	$21.95
Traxx (8K)	$17.95
Blitzkreig	$15.95

(8K) = Requires 8K or greater memory expansion on Vic-20

FOR THE COMMODORE-64

	Suggested Retail
Attack of the Mutant Camels	$22.95
Gridrunner 64	$21.95
Lazer Zone 64	$22.95
Matrix 64	$22.95
Rox 64	$15.95



All enquiries for South Australia and Northern Territory:
Universal Software, P.O. Box 583, Cowandilla,
South Australia 5033. (08) 219 4391

SOLE AUSTRALIAN DISTRIBUTOR:

Progressive Software Publishers

P.O. Box 436, Pymble, N.S.W. 2073 Tel: (02) 44 6393

Selected titles available from Dick Smith Electronics

NOW AVAILABLE FROM THE FOLLOWING DEALERS

N.S.W. — Sydney City:
The Computer Spot (02) 235 2971
City Personal Computers(02) 233 8992
Albury: Data Parts (060) 218 080
Camden: Seahorse Comp.(046) 666 406
Cessnock: Moads Elect. (049) 901968
Chippendale: The Micro Computer House (02) 698 7866
Grafton: Grafton Comp. C.(066) 426790
Kingsford: Micro Visions(02) 662 4063
Liverpool: Comput. Focus(02) 600 8222
Penrith: Comp. Lighthouse(047) 314429
W'longong: Comp. Spect.(042) 271 666

VICTORIA
Abbotsford: Maxwell O.E.(03) 419 6811
Bendigo: Data Parts (054) 434866
Minit Computer Services(054) 432589
Glen Waverley: The Computer Deli (03) 561 7511
Greythorn: Ultraphase (03) 857 4233
Mt. Albert: Panatronics(03) 890 0579
Richmond: High Technology Computers (03) 429 1966
Shepparton: Data Parts(058) 217 155

QUEENSLAND
Brisbane: C.W. Elect. (07) 397 0888
Complete Computers (07) 350 1255
Southport: Scarborough Fair Computers (075) 32 5133
Taringa: Software 80 (07) 371 6996
Townsville: Northern Computer Sales (077) 724 2222

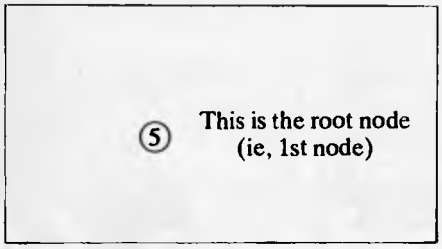
WESTERN AUSTRALIA
Leederville: Bruining Headlam Computers (09) 381 2070
Osborne Park: Vic. West(09) 444 2932

A.C.T.
Fyshwick: Steve's Communication Centre (062) 80 4339

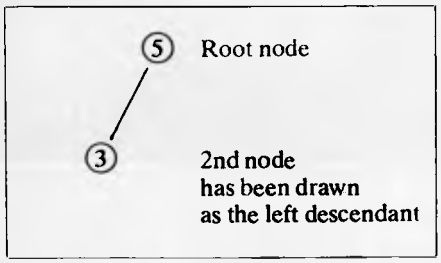
SOUTH AUSTRALIA
Blackwood: Datapunch Computers (08) 278 8662
Richmond: Computer Services Company (08) 352 7911

TASMANIA
Hobart: Quantum Comp.(002) 31 0222
Launceston: Advanced Electronics (003) 7075

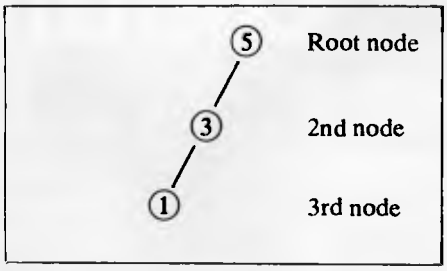
vacant descendant position. We shall take the list of numbers in left to right order and this means that the first number 5 becomes the root node. If I go through step by step I am sure you will get the general idea.



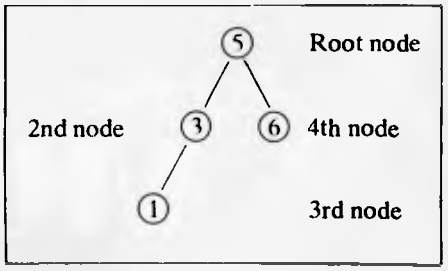
The next number in the list is 3. Since our tree has only one item on it and therefore has no descendants we ask 'is 3 less than or equal to 5?' Since it is less than 5, we shall draw 3 as the left descendant of the root node as follows:



The third item in the list is the number 1. To place this in its correct position, according to our rules, we proceed as follows: we compare the new entry, ie, number 1, with the root node. Since 1 is less than the *value* of the root node we proceed to examine the left descendant of the root node which in this case is node number 2 the second item that we added to the tree. We ask 'is the value of the new entry less than or equal to the *value* of node number 2?' Since it is less than the value, we see if node 2 has a left descendant. It hasn't and so this is where our new entry, the number 1, will be stored.



The fourth item in our list is the number 6. We do exactly the same as before and compare this value with the value of the root node. In this case the value is greater than that of the root node value. Since there is not a right descendant of our root node at present we proceed by making our fourth new entry the right descendant as follows.



Make quite sure you are clear about the terminology because I can remember this causing problems myself. The numbering of the nodes themselves is dependent on the order in which we are placing the items onto the tree. When we compare values, in order to ascertain where particular items should be placed, we are interested in the actual *value* that a particular node will have.

Let us place the last item in our list onto our tree. The item is the number 4. We compare the number 4 to the value of the first node in our tree. Since 4 is less than 5 we move to the left descendant of the first node. This is node number 2 which has a value of 3. We ask 'is 4 less than or equal to

NEW!

Deloitte Haskins & Sells'
Businessman's Guide to
MICRO-COMPUTERS

Deloitte Haskins & Sells, a firm of Chartered Accountants,
has developed this guide to assist businessmen in choosing and using micro-computers in their business. It is . . . .

Relevant

containing information on products currently available in Australia and New Zealand.

Business orientated

concentrating on applications for financial modelling, databases, word processing and general accounting.

Independent

giving the authors' subjective comments on specific micro-computers and software products rather than merely providing details that could be obtained from advertisements.

Practical

including checklists, summary charts and other information to help you make a sound purchasing decision.

It has been written in a practical, easy-to-read style telling businessmen almost everything they **need to know about micro-computers.**

PHA

Available now from all good bookshops!

In case of difficulty send your cheque for $19.95 to:

Prentice-Hall of Australia Pty Ltd

7 Grosvenor Place, Brookvale NSW 2100 (02) 939-1333 or 209 Glenhuntly Road, Elsternwick VIC 3185 (03) 528-2866

bubble bus

hustler

All enquiries for South Australia and Northern Territory.
Universal Software
P.O. Box 583, Cowandilla
South Australia 5033
(08) 219 4391

For the Commodore 64, on cassette tape

UNQUESTIONABLY one of the best games available on the COMMODORE 64.

Written in machine code and using sprite graphics to the full, HUSTLER takes game playing to new heights with its mixture of six games, for one or two players, and superb computer generated music.

The HUSTLER includes the following games:

1. **One Player — ANY BALL ANY POCKET**
2. **One Player — BALLS IN ORDER**
3. **One Player — BALL IN ITS POCKET**
4. **Two Players — SCORE THE POCKETS**
5. **Two Players — MINI POOL**
6. **Two Players — LOWEST AND HIGHEST**

HUSTLER also keeps track of High Scores.

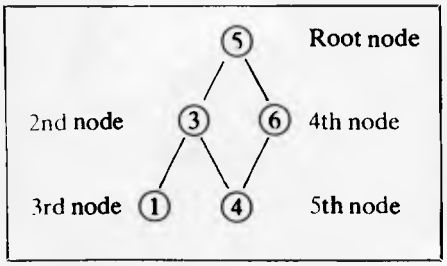
only $22.95 on cassette tape

Available from your local dealer.

DEALER ENQUIRIES WELCOME

SOLE AUSTRALIAN DISTRIBUTOR — PROGRESSIVE SOFTWARE PUBLISHERS
P.O. Box 436, Pymble 2073 Telephone: (02) 446393

3?' Obviously it's not, so seeing that there is not a right descendant of this node we complete our tree by making the last entry the right descendant of node number 2.



You have now created a 'sort tree' and at a first glance you may well be wondering what use such a structure can be. It can be noticed that the leftmost item on the tree is in fact the one with the lowest value. It is also apparent that the rightmost item is in fact the one with the largest value. Other than that there does not appear to be anything special about the arrangement.

Before we continue, try and draw a sort tree for the following list. This time we will consider a list of seven words:
ENGLAND, AMERICA, FRANCE, RUSSIA, SPAIN, GERMANY and CANADA
Use exactly the same rules as we did before only apply them to the alphabetical rather than numeric ordering.

You should end up with the structure as shown in Fig 6.

It is convenient in general to write the value of a node in a circle or rectangle and then in the top right above it put the node number, eg, Node 5 has the value 'SPAIN' in the above example.

If you are still unsure about how to draw a sort tree from a list of numbers or words then write a few of your own lists and draw out their corresponding sort trees. Do it until you are quite clear in your own mind about the processes involved.

Two points should be noted in passing: firstly, it was purely an arbitrary decision to make the 'less than or equal to' decision correspond to the 'left descendants' in the tree. We could equally have used the reverse convention. Secondly, we could have split the decision part into 'less than' and 'equal to or greater than'. Again it was purely arbitrary.

What however was important was that the way we split the decision part enabled us to classify any incoming items into only one of two types. Thus there was never any doubt about the exact position that an incoming item would occupy on an existing tree.

Let us look at two other ways in which we could represent such a tree structure. Firstly we could represent it as a 'Table'. Look at Fig 3, it shows in table form the tree structure that we obtained with our list of numbers:

Node	Data Item	Parent	Left	Right
1	5	0	2	4
2	3	1	3	5
3	1	2	0	0
4	6	1	0	0
5	4	2	0	0

Fig 3

Such a table is easily handled in many high level languages. In Basic, for instance, it would be possible to define an array using statements like DIM T (5,4) if you wished to store the above table. (Obviously you could use the zero'th elements in practice.) In this instance T (n,1) would refer to the n'th nodes value; T (n,2) the node that is the parent of the n'th node; T (n,3) would be the left descendant of the n'th node, etc. We shall look at a Basic program that will produce these type of tables later on.

Another way of representing a tree structure is with a different type of table. This is shown in Fig 4. Supposing that for a tree containing N items we labelled N columns as the Nodes 1,2,3 . . . N; and labelled N rows similarly as the Nodes

DISKETTES-SPECIAL OFFER

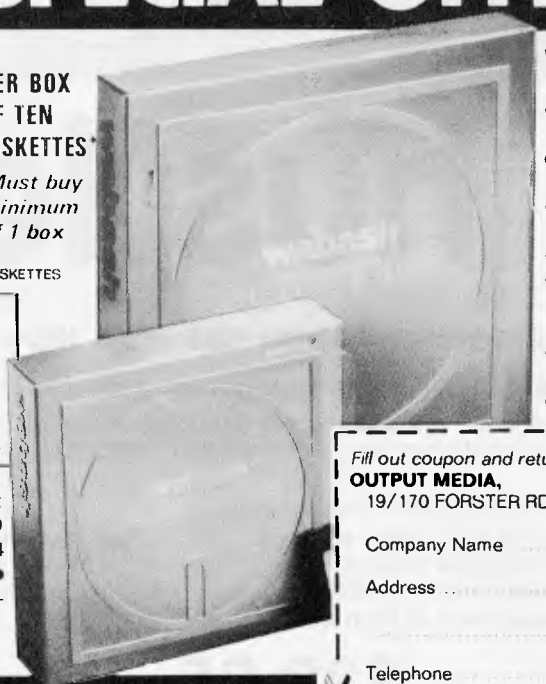
Latest U.S. Technology
FOR WORD PROCESSING AND HOME HOBBYISTS
$35 PER BOX OF TEN DISKETTES*
Must buy minimum of 1 box
with Full Warranty
* THIS OFFER APPLIES TO 5¼ SINGLE-SIDED SINGLE DENSITY DISKETTES

Suitable for
- APPLE I Personal Computer
- ATARI 810 Microcomputer
- OLIVETTI 351 Word Processor
- WANG VS100/PLS11
- XEROX 820 Word Processor
- ADLER SE1030 Memory Typewriter

AND MANY OTHER COMPUTER HARDWARE

wabash Produces diskettes for most computers such as • KAYPRO 11 • APPLE LISA • VECTOR 4 • LABTAM • NEC RANGE • WANG • IBM P.C. • COMMODORE • MITSUI • NORTHSTAR

ENQUIRIES FROM RE-SELLERS WELCOMED



wabash®
- Guaranteed true to its label by international standards.
- Comprehensive range of 5¼" and 8" diskettes.
- Reliable service and delivery Australia-wide.
- Price competitive — all lines.
- Will meet the diversified demands of the business, medical and home applications.
- Complete range of magnetic tape.
- Full warranty on all products

OUTPUT MEDIA PTY. LTD.
19/170 Forster Road, Mt. Waverley, Vic. 3149. Phone (03) 544 4422
BARCLAY AND SHARLAND
Cnr. Phoenix and Sudlow Roads, Spearwood, WA 6163. Phone (09) 418 3844

Fill out coupon and return with cheque for total amount to
OUTPUT MEDIA,
19/170 FORSTER RD., MT. WAVERLEY, VIC 3149

Company Name .....
Address .....
.....P/code.....
Telephone .....
Contact Name .....
☐ Boxes of ten 5¼" SSSD Diskettes at $35 per box
Cheque enclosed for total amount of $ .....
APC 7/83

		DESCENDANTS				
		1	2	3	4	5
PARENTS	1	0	1	0	1	0
	2	0	0	1	0	1
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

This is the bit-map representation of Fig 3

Fig 4

1,2,3 . . . N. We could specify that a node, 'p', say, was the Parent of Node 'q', by placing a 1 in the table position (p,q). This type of representation is normally called a 'bit map' or a 'relation matrix'. One advantage of such a description is that it can, by various techniques, be made very compact. Another advantage is that we can use matrix algebra to manipulate the relations. One disadvantage is that to make use of this type of representation you need some quite complex programming — the complexity is nothing to do with the concept of a tree itself; it is a characteristic of this particular way of representing them.

The Relation Matrix representation is not a good way to develop an understanding of the fundamental concepts of tree structures and so we shall not discuss them further in this article.

For most applications of binary trees it is possible to use a table representation, similar to that described earlier.

Building a 'Tree Table'

Now that you have 'worked through' the creation of some simple binary trees and drawn the corresponding table forms, you will appreciate the type of questions that one asks as a tree is built. Firstly, we need to know whether there are any items on the tree at all. If there are not, then all we have to do is make sure that the item being added becomes the 'Root' node. If there are items on the tree already, then we shall have to compare our incoming item in exactly the same way as we did when we were drawing the trees in picture form.

I will use Microsoft's Basic for the examples since it is very popular. I will assume that within the program we shall use a variable called N% to hold the number of items that will be present on our finished tree. I will also use the variable NEW.NODE% to represent the number of the item we are adding. The data items themselves will be placed in a vector variable called DATA.ITEM$().

We shall call the routine 'Create Tree' and we shall write it as a subroutine that can be used as a general utility. The line numbers have been chosen arbitrarily. To place the first item on our 'tree' we simply copy the item into DATA.ITEM$(1). For the second item onwards we must collect the data items and then adjust the necessary tree table pointers. We are implying the existence of a further subroutine that will collect the input item in one element of the vector variable DATA.ITEM$(). The element is specified by the node number held in a further variable which we call NEW.NODE%. The first 'level' of the Create Table subroutine therefore will look like this:

```
490 REM
500 NEW.NODE% = 1:GOSUB 5000' Collect first input item
550 FOR NEW.NODE% = 2 TO N%
560 GOSUB 5000' Collect next input item
580 GOSUB 1000' Store new item on tree
590 NEXT NEW.NODE%
600 RETURN
610 REM
```

We must not forget that we will need to define space for our 'table'. To do this we shall, for the present, assume that somewhere in our finished program we will be using a dimension statement such as the following:

```
DIM DATA.ITEM(N%),
PARENT%(N%)
DIM LEFT.DESCENDANT%(N%),
RIGHT.DESCENDANT%(N%)
```

I am not particularly interested, at the moment, in writing 'compact' code. I simply want to ensure that you can look at the various sections of code and relate them to what we were doing when we were drawing pictures of tree structures earlier. It is for this reason also, that I have chosen variable names that are descriptive.

The building of our 'tree' really starts with subroutine 1000. As yet this is undefined but we do know that the object will be to compare the incoming value with various nodes already on the tree. Since we will always have at least one node in the tree before using subroutine 1000 we will not need to check whether the tree exists or not. Look at the first few lines of subroutine 1000.

(Bear in mind that Basic WHILE/WEND loops and other condition test statements have an implied condition as per standard logic operations in Basic. When we are testing, eg, for WHILE J% <> 0 we do not need to state explicitly the 'not equal to 0' part. We can simply write WHILE J%. I will write these conditions explicitly while looking at the various sections of code.)

```
990 REM
1000 J%=1 ' We start at the 'Root' node,
     ie, node 1
1010 WHILE J% <> 0
1020 IF DATA.ITEM$(NEW.NODE%)
     <=DATA.ITEM$(J%)
     THEN GOSUB 1200 ELSE GOSUB
     1400
1030 WEND
1040 RETURN
1050 REM
```

Notice that we are using a variable J% to identify the position in the tree that we are examining. We compare the current item that is being placed on the tree with node J%. If the *value* of the new data item is 'less than or equal to' the *value* of the node being examined then we must move down to the left descendant of the node being examined. If the *value* of the new data item is greater than the *value* of the node being examined then we will move down to the right descendant of the node being examined. These two alternatives are handled by two separate subroutines as follows:

```
1170 REM
1180 REM NEW ITEM IS LESS THAN
     OR EQUAL TO VALUE OF
     NODE J%
1190 REM
1200 IF LEFT.DESCENDANT%(J%)
     <>0 THEN J%=
     LEFT.DESCENDANT%
     (J%):RETURN
1210 PARENT%(NEW.NODE%)=J%
1220 LEFT.DESCENDANT%(J%)=
     NEW.NODE%
```

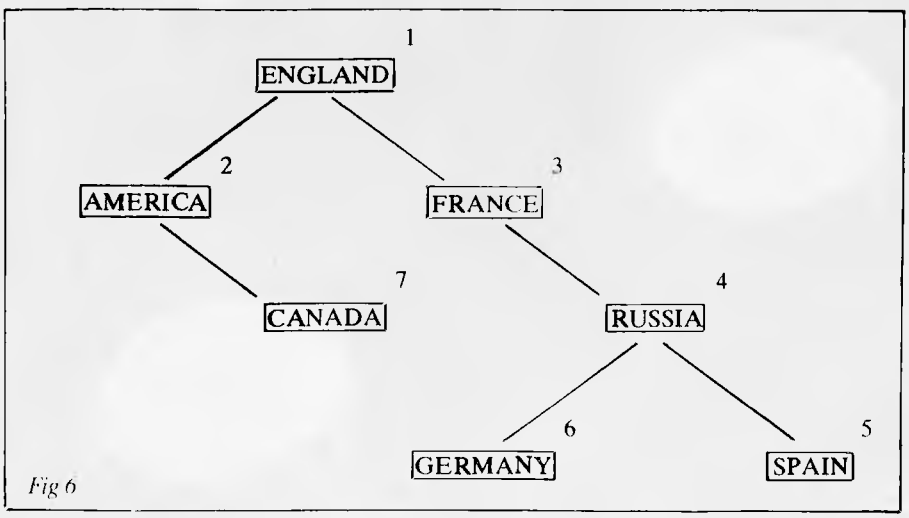


Fig 6

FREE GAME OFFER
If you own a Commodore home computer, here's an offer too good to miss.
Buy any Computer Classics VIC 20 game and get Galactic Defender **free.**
Or buy a Computer Classics 64 game and get Stratagem **free.**
Two explosive games for the price of one.
Only from Computer Classics.
Available from all leading software retailers.
COMPUTER CLASSICS
THE MINDBENDERS
VCC3555

```
1230 J% = ' this forces us to leave WHILE/
     WEND loop in sub 1000
1240 RETURN
1250 REM_____

1370 REM_____
1380 REM NEW ITEM IS GREATER
     THAN VALUE OF NODE J%
1390 REM_____
1400 IF RIGHT.DESCENDANT%(J%)
     <> 0 THEN J% = RIGHT.
     DESCENDANT% (J%):RETURN
1410 PARENT% (NEW.NODE%) = J%
1420 RIGHT.DESCENDANT% (J%) =
     NEW.NODE%
1430 J% = 0 ' this forces us to leave WHILE
     /WEND loop in sub 1000
1440 RETURN
1450 REM_____
```

Only one or the other of these subroutines will be called during the positioning of a given new item. Let us analyse the one corresponding to 'less than or equal to'. We have already tested the new data item value and the node J% and have found the value of the new item to be 'less than or equal to' the value of the current node that is being examined, ie, node J%. Line 1200 looks to see whether node J% has got a left descendant.

If it has, then we set J% to the value of LEFT.DESCENDANT % (J%) and then return from the subroutine 1200 via the RETURN statement on the same line.

The result of such an action is to return us into the WHILE/WEND loop of subroutine 1000 where again we compare the data item that we are trying to place on the tree with what is now a new node J%. We than repeat the process again and we are, in effect, moving down through the tree in just the same way as we did manually with our pictures.

If the test in line 1200 fails, ie, if there is no left descendant then we know straightaway that our new item is going to become that descendant. We also know that the current node J% is therefore going to be the parent of the new node that we shall create. In cases where the condition test in line 1200 fails we alter the left descendant pointer of node J% (which was zero) to the value NEW.NODE%. We also make node J% the parent of the new.node. Since by this time the new item has been placed on the tree we set J% to zero. By doing this we will automatically leave the WHILE/WEND loop that will still be in operation at the subroutine 1000 level. This will ensure that we fall through this level back to subroutine 500 ready to 'pick up' the next item that is to be placed on the tree.

Subroutine 1400 operates in a similar fashion but concerns itself with those occasions that involve moving to a right descendant.

If we are to retrieve data in ascending order from our tree we must be able to locate the 'lowest value' node that is present. From some of the tree structures that you have drawn you have probably guessed already that all one needs to do is start at the root node and keep going left until we run out of descendants.

We write a subroutine called 'Lowest-node' to do this with a single line of Basic as follows:

```
1420 REM_____
2990 LOWEST-NODE-SUBROUTINE
2995 REM_____
3000 WHILE LEFT.DESCENDANT%
     (J%) <> 0:J% =
     LEFT.DESCENDANT% (J%)
     :WEND:RETURN
3030 REM_____
```

We enter the above subroutine with J% as the number of the root node. The lowest value node is returned in J% overwriting the original value. By writing the subroutine in this way we can use it to find the lowest node of a special section of a tree known as a 'subtree'. Consider any tree and then consider a particular node on it, N, say, as being the root of a smaller tree. That smaller tree is the subtree of node N. We also talk about 'left' and 'right' subtrees. These are the subtrees formed by considering, respectively, the left and right descendants of a node as root nodes.

Before we can construct a program using these routines we must consider one last problem. Given a particular node we want

EXECUTIVE 64
COMMODORE'S NEW PORTABLE COLOUR COMPUTER
COMMODORE 64
VIC 20
SEGA SC 3000
ORIC 1
VECTREX
FOR ENTERTAINMENT, EDUCATION, BUSINESS AND APPLICATIONS
WE ARE THE COMMODORE EXPERTS
SALES
REPAIRS & SERVICE
BOOKS & MAGAZINES
ELECTRONIC DATABASE SHOPPING & HELP SERVICE
LARGEST SOFTWARE RANGE
COMPREHENSIVE CATALOG
OPEN FRIDAY NIGHT AND SATURDAY MORNINGS
WE SUPPORT OUR CUSTOMERS
COME IN AND SPEAK TO OUR EXPERIENCED STAFF WHO CAN GIVE YOU THE RIGHT ADVICE TO ENABLE YOU TO GET THE MOST FROM YOUR COMPUTER INVESTMENT
ENQUIRE ABOUT OUR CHRISTMAS SPECIALS
HIGH TECHNOLOGY COMPUTER SYSTEMS PTY. LTD
87 SWAN ST., RICHMOND VIC 3121. Phone: (03) 429 1966
730 HIGH STREET RD., GLEN WAVERLEY. Phone: (03) 233 7851

to be able to find the node that is next in ascending order and print it. To do this we do *not* have to consider any of the values of the data items themselves because the order can be deduced from the parent, left descendant, right descendant pointers that our 'Create Table' subroutine has provided.

If you consider some drawn examples you will convince yourself that any subtree formed using the right descendant of a particular node N will only contain values greater than the value of node N. If we search this subtree for the node of lowest value we will have found the item that is next in order. Remember that we have already developed a subroutine to search a tree for the lowest value and we will be able to use this to search our subtrees as well.

It is possible, of course, that the current node being examined will not have a right descendant. If this is the case we must move up to the parent of the current node and repeat the process but, if we are moving up from a right descendant we must ignore this parent and move up again because the node will already have been printed. If during this 'climbing back' we find ourself at the root node then we will have printed all the nodes in the tree.

It is very helpful to relate these ideas to diagrams of various trees. Draw various subtrees in different colours, etc, and work through the above ideas on paper. As you develop a mental picture of how we are selecting the next item to print you will find the coding easier to follow.

The essential details of 'Next-node' are as follows: we look at the current node and ask 'is there a right descendant?' The coding is done like this:

```
3090 REM_____
3100 IF RIGHT.DESCENDANT%(J%)
     <>0 THEN GOSUB 3200 ELSE
     GOSUB 3300
3110 RETURN
3120 REM_____
```

Corresponding to the two possibilities we choose between two subroutines.

If there is a right descendant then we move to it and then we use 'Lowest-node' to find the lowest valued node of this right subtree as follows:

```
3190 REM_____
3200 J%=RIGHT.DESCENDANT%
     (J%):GOSUB 3000 ' Lowest-node
3220 RETURN
3230 REM_____
```

If a right descendant does not exist we have to move up the tree. We keep track of the previous value of J% so that we can check whether we have moved upwards from a right descendant. This is how we do it:

```
3290 REM_____
3300 IF J%=1 THEN EXIT.FLAG%=
     0:RETURN
3310 OLD.J%=J%:J%=PARENT%
     (J%):
     IF RIGHT.DESCENDANT%(J%)
```

```
2    REM_____
3    REM          SET-UP-BLOCK
4    REM_____
5    CLEAR:WIDTH LPRINT 70:INPUT "How many items do you wish to
     store";N%
10   DIM DATA.ITEM$(N%),PARENT%(N%),LEFT.DESCENDANT%,
     (N%),RIGHT.DESCENDANT%(N%)
25   REM_____
30   GOSUB 500 ' Build Tree Table
32   REM_____
33   REM          PRINT-TABLE
34   REM_____
35   LPRINT "Tree Table has been created as. . .":LPRINT
37   LPRINT "NODE","DATA ITEM","PARENT","LEFT","RIGHT"
40   FOR I%=1 TO N%
50       LPRINT I%,DATA.ITEM$(I%);:
55       LPRINT TAB(30) PARENT%(I%),LEFT.DESCENDANT%(I%),
         RIGHT.DESCENDANT%(I%)
60   NEXT I%
80   REM_____
90   REM          PRINT-DATA-IN-ORDER
100  REM_____
105  LPRINT:LPRINT "Order list is as follows. . . ":LPRINT
110  J%=1:GOSUB 3000 ' Lowest-node
115  EXIT.FLAG%=1
120  WHILE EXIT.FLAG%
130      LPRINT DATA.ITEM$(J%),:GOSUB 3100 ' Next-node
150  WEND
160  END ' . . . Logical End of Program
460  REM_____
470  REM          CREATE-TABLE-SUBROUTINE
480  REM_____
500  NEW.NODE%=1:GOSUB 5000 ' Input data item
550  FOR NEW.NODE%=2 TO N%
560      GOSUB 5000 ' Input data item
570      GOSUB 1000 ' 2nd level of this routine
580  NEXT NEW.NODE%
590  RETURN
1000 J%=1
1010 WHILE J%
1020     IF DATA.ITEM$(NEW.NODE%)<=DATA.ITEM$(J%) THEN
GOSUB 1200 ELSE GOSUB 1400
1030 WEND
1040 RETURN
1200 IF LEFT.DESCENDANT%(J%) THEN J% =
     LEFT.DESCENDANT%(J%):RETURN
1210 PARENT%(NEW.NODE%)=J%:LEFT.DESCENDANT%(J%) =
     NEW.NODE%:J%=0:RETURN
1400 IF RIGHT.DESCENDANT%(J%) THEN J% =
     RIGHT.DESCENDANT%(J%):RETURN
1410 PARENT%(NEW.NODE%)=J% RIGHT.DESCENDANT%(J%) =
     NEW.NODE%:J%=0:RETURN
1420 REM_____
2990 REM          LOWEST-NODE-SUBROUTINE
2995 REM_____
3000 WHILE
     LEFT.DESCENDANT%(J%):J%=
     LEFT.DESCENDANT%(J%):WEND:RETURN
3030 REM_____
3080 REM          NEXT-NODE-SUBROUTINE
3090 REM_____
3100 IF RIGHT.DESCENDANT%(J%) THEN GOSUB 3200 ELSE GOSUB 3300
3110 RETURN
3200 J%=RIGHT.DESCENDANT%(J%): GOSUB 3000 ' Lowest-node
3220 RETURN
3300 IF J%=1 THEN EXIT.FLAG%=0:RETURN
3310 OLD.J%=J%:J%=PARENT%(J%):IF RIGHT.DESCENDANT%(J%) =
     OLD.J% THEN GOTO 3300
3320 RETURN
```

Only an Atari® Supercomputer™ can give you all this...

☐ 16K Memory expandable to 64K ☐ International Character Set
☐ Over 1,000 ready-to-use programs ☐ Help Key
☐ Built-in Atari Basic Programming Language
☐ Complete range of plug-in Peripherals ☐ CP/M*† Option
☐ 5 Programming Languages ☐ 29 Graphics Keys
☐ 11 Graphics Modes ☐ 5 Text Modes ☐ 256 Colours ☐ 4 Sound Voices
☐ And more

For only $399 RRP

ATARI® 600XL™ Home Computer

Futuretronics

We'll show you the way

Available from leading Atari stockists

ATARI

® & TM are trademarks of Atari Inc., or Futuretronics Australia Pty. Ltd. *CP/M is a trademark of Digital Research Corp. † Tentative title.

CONCORD/8687

```
3330 REM
4980 REM          INPUT-SUBROUTINE
4990 REM
5000 INPUT"Enter value to be stored";DATA.ITEM$(NEW.NODE%):RETURN
5010 REM
```

```
= OLD.J% THEN GOTO 3300
3320 RETURN
3330 REM
```

The completed subroutine can be seen in the listing of the example program where the above sections of code have been combined into a single block entitled 'Next node'.

A typical program

We have developed three fairly simple subroutines that enable us to:

a) Build a table corresponding to a tree structure.
b) Find the lowest node of a tree or subtree.
c) Find the next node in ascending order.

I have combined these subroutines into a short program that does the following:

a) Builds a tree table using input from the terminal.
b) Prints the table, using a simple loop, so that you can examine it.
c) Prints the input data in ascending order using calls to 'Lowest node' and to 'Next-node'.

I have written some of the ideas that we have discussed as multiple line statements. Implied tests, eg, WHILE J%, rather than the explicit WHILE J% <>0, have also been used to shorten some of the lines of code. Fig 5 shows an example of the output that the program provides.

A final word

If you have not used 'tree sorts' before then the speed of these routines will be very impressive. Of particular interest is that we achieve the sorting without physically rearranging any of the data items by using pointers to specify the logical structure of the corresponding tree.

My decision to use the 'Parent' pointers needs a certain justification. Those of you who have come across these types of sorts before will be aware that it is standard practice to eliminate the parent pointers thus saving 33% of the total pointer space. It is also common practice to use recursion to provide some very elegant routines. These and other refinements such as relation matrix representation, when considered collectively, do a great job at hiding the essential simplicity of the fundamental concepts.

Those of you that have found the ideas straightforward may like to consider how the parent pointers can be eliminated. Look at the coding for the subroutines 'Lowest node' and 'Next node'. There is only one place that we actually use the parent pointers (program line 3310). If, within these two routines, we created a list of nodes that we encounter as we climb down a tree then we could climb back up by reading the list backwards. In this case we would only need to create left and right pointers in our table. Such space saving becomes increasingly more important as the size of the data set with which we are dealing increases.

Fig 5

Tree Table has been created as:

NODE	DATA ITEM	PARENT	LEFT	RIGHT
1	PAUL	0	2	3
2	ANDY	1	6	4
3	RUTH	1	12	28
4	GEORGE	2	9	5
5	MABEL	4	7	39
6	AMANDA	2	8	35
7	JENSINE	5	10	11
8	ALBERT	6	0	0
9	FRANK	4	15	14
10	IAN	7	31	21
11	JOSEPH	7	13	20
12	PETER	3	0	19
13	JOHN	11	38	0
14	FRED	9	0	0
15	CYRIL	9	16	18
16	CHRIS	15	22	17
17	CHRISTINE	16	0	0
18	DAVE	15	0	25
19	RONALD	12	33	29
20	KEVIN	11	26	0
21	JANICE	10	37	0
22	ANNE	16	23	24
23	ANN	22	0	0
24	CAROLINE	22	34	0
25	DAVID	18	0	0
26	JOYCE	20	0	27
27	JUDY	26	0	30
28	WENDY	3	40	0
29	RUSS	19	0	0
30	JULIE	27	0	32
31	HAROLD	10	0	0
32	KAY	30	0	0
33	ROBERT	19	0	36
34	BOB	24	0	0
35	ANDREAS	6	0	0
36	ROLF	33	0	0
37	JACK	21	0	0
38	JILL	13	0	0
39	MAUREEN	5	0	0
40	SANDRA	28	0	0

Ordered list is as follows:

ALBERT	AMANDA	ANDREAS	ANDY	ANN
ANNE	BOB	CAROLINE	CHRIS	CHRISTINE
CYRIL	DAVE	DAVID	FRANK	FRED
GEORGE	HAROLD	IAN	JACK	JANICE
JENSINE	JILL	JOHN	JOSEPH	JOYCE
JUDY	JULIE	KAY	KEVIN	MABEL
MAUREEN	PAUL	PETER	ROBERT	ROLF
RONALD	RUSS	RUTH	SANDRA	WENDY

IT'S HERE!

KnowledgeMan...

...the all-in-one software package that makes hardware selection a breeze.

Unlike many software packages—KnowledgeMan doesn't restrict your hardware selection by only running on one or two specialised operating systems.

Choose your favourite computer and you can instantly reap the benefits of KnowledgeMan's sophisticated, yet easy-to-use facilities.

Giving you the very best of the data base management and spreadsheet worlds, KnowledgeMan is completely integrated—to manage information like no other software can.

KnowledgeMan is much more than just a relational data manager. It's a comprehensive system for business information needs including:

* Third Generation Spreadsheet
* Ad Hoc Enquiries (like IBM's SQL/DS)
* Screen I/O Management
* Forms Management
* Structured Programming Language

All are integrated so you can intermingle various kinds of processing with ease. For example, you can query your data base form within the spreadsheet, and use the results in the spreadsheet's cells. With KnowledgeMan you'll solve MORE problems...pose MORE questions...simulate MORE "What if?" questions.

A further big reason why KnowledgeMan should be your next software choice. The PRICE! Compare the prices of KnowledgeMan to Lotus 123 or dBASE II—you'll be pleasantly surprised. KnowledgeMan retails for only $635 (including tax).

COMPARISON TABLE	dBASE II	123	KNOWLEDGE MAN
STORING & RETRIEVING DATA			
* Max fields per record	32	256	255
* Max files open at once	2	1	Unlimited
* Max number of indexes open per file	7	0	Unlimited
* Max records per table	65,535	2,048	65,535
* Query multiple tables with a single command	No	No	Yes
* Dynamic sort of query output	No	No	Yes
* Multi-level control breaks	No	No	Yes
USING A SPREAD SHEET			
* Rows by columns	0 x 0	2048x256	255x255
* Cell can extract data from independant tables	No	No	Yes
* Cell can be entire program	No	No	Yes
MAKING SCREENS & FORMS ATTRACTIVE			
* Color, reverse video, blinking, half-intensity bell	No	No	Yes
* Form-at-a-time processing	No	No	Yes
SAFEGUARDING DATA			
* Passwords, data encryption	No	No	Yes
* Field level read/write protection	No	No	Yes

(The information in this table is believed to be correct, based upon vendor documentation but cannot be guaranteed).

The financial modelling, budgeting, sales reporting/analysis, billing reports, order entry, job costing and more, KnowledgeMan is for YOU.

Easy to use, Powerful, Flexible—and great with figures and statistics including means and standard deviations. Square roots, logarithms, trig functions, random numbers etc.

And best of all, KnowledgeMan can be just about everybody's friend. It currently runs on the **IBM PC, IBM PCXT, DEC Rainbow, NEC APC, Compaq Portable Computer, Eagle PC, Eagle 1600, Columbia MPC, Columbia VP Portable, Corona PC, Corona Portable PC, Olivetti, Sirius, MSDOS CP/M 86, CompuPro (with Televideo 950/925) Televideo, Stearns Computer.** Soon to be released for Texas Instruments Professional computer.

So NOW is the time to call Multisoft for your KnowledgeMan package—the software that "Out Thinks" the competition.

Order your KnowledgeMan **today!** Send cheque or money order to Multisoft, 1121 Hay Street, West Perth. 6005. Ph: (09) 322 6637.

NAME: _____

COMPANY: _____

ADDRESS: _____

POSTCODE: _____

Operating System: ☐ PCDOS ☐ MSDOS ☐ CP/M86

MACHINE: _____

[ ] Cheque/Money order enclosed. Add $5 for shipping costs for each package ordered.

[ ] Bankcard N° ☐☐☐ ☐☐ ☐☐☐ ☐☐☐☐☐☐

Expiry date_____ Signature_____

[ ] Please rush me more KnowledgeMan information.

Multisoft

...providing software to Australia.

FOCUS ON VISI ON

Not content to rest on its laurels, VisiCorp, the company which achieved recognition with its VisiCalc spreadsheet package, is on the point of unveiling its latest software innovation, Visi On: a multi-window, integrated applications package. Robin Webster and Leslie Miner managed to get a sneak preview.

The software company VisiCorp believes it 'ignited the explosion of personal computer usage in business' by introducing the now famous VisiCalc spreadsheet package. Now VisiCorp has the computer industry wondering whether or not it is about to set a whole new standard for user interface design with its long-awaited, multi-window, integrated applications environment. Already, VisiCorp has made pacts with an impressive cross-section of the computer community: major hardware manufacturers have signalled support by signing licensing deals for the product. Xerox (which originally developed the whole concept for such a product), is adapting the product so that it will work on the Ethernet network system. Digital Research, the inventor of CP/M, has announced its support; and other third-party software developers are queueing to get their products into what they see as a potentially vast distribution channel.

The product is called Visi On (that's currently the official style — VisiOn, Visi/ON, Visi ON, etc, are out). With the current trend towards highly sophisticated graphics interfaces, you might expect Visi On to be an icon-based system, but it is not. The two major systems already on the market with which it will inevitably be compared— the Xerox 8010 (Star) and the Apple Lisa — have adopted graphic representations of common desktop objects, called icons, as the major method for entering commands and manipulating information.

In place of icons, Visi On's developer, VisiCorp, has decided to maintain and enhance the menu bar or menu line approach as featured in other 'Visi' software packages such as VisiWord, and other well known products like Lotus 1-2-3 (see review in this issue). There are a number of reasons, some technical, others subjective, why this decision was made and we will look at them in more detail later.

In common with the Star and the Lisa, Visi On enables a user simultaneously to work with the contents of diverse application program files in the form of 'windows'; rectangular regions that are designed to appear to the user like standard sheets of paper aranged on a desktop. These windows, and their contents, are moved around and generally dealt with by means of an input device known as a mouse. Unlike conventional up/down/left/right cursor direction keys which only allow straight line movements across character spaces or over line intervals, the mouse provides extremely precise, pixel by pixel, accuracy.

Having realised that Visi On is menu-driven as opposed to icon-driven, a newcomer might well think that this product, and those produced by Xerox and Apple, all provide much the same facilities and are therefore direct competitors.

This is not so.

To begin with, Visi On is strictly a software package designed to run (initially) on 16-bit microcomputers that support Microsoft's MS-DOS operating system or its derivatives such as the IBM PC's PC-DOS.

In fact, one of Visi On's chief features as a software product will be its portability across a wide selection of machines. Agreements have already been reached (or are under negotiation) with IBM, Digital Equipment, Honeywell, Texas Instruments, and Wang, whereby those companies will support the product on their personal computers. (This review was mainly carried out on a Wang Personal Computer, although a limited time was made available on an IBM PC as well.)

The Xerox 8010 and the Apple Lisa, on the other hand, are office systems which exhibit a very high degree of hardware/software integration. In other words, these systems were designed from the ground up to provide a complete operating environment — and not as software add-ons to existing pieces of equipment. There were reasons for the hardware/software integration, and consequently those machines provide a far more sophisticated range of features than are presently available with Visi On. The sophisticated systems include pull-down menus, extensive graphics capabilities, and black-on-white displays that are aesthetically pleasing and more characteristic of paper and ink documents.

Nevertheless, a lot of deserved excitement has been generated about Visi On since the main operating system/environment together with three applications packages — Visi On Word, Visi On Calc and Visi On Graph — plus an optical mouse will cost $1710 in the US.

This is, of course, good news for those who already own one of the systems on which the package will be run, including all the other hardware requirements necessary to support it. You need a 16-bit machine running MS-DOS, a minimum CPU operating speed of 5MHz, 256k of main memory, one dual-sided (360k) floppy disk plus at least one 5 Mbyte hard disk (obviously a 10 Mbyte hard disk will do), and a directly addressable bit-mapped display with the usual minimum of 24 lines x 80 columns (in the case of the IBM PC and many of its work-alikes a colour/graphics adapter is required).

For those who do not have the right equipment, the entry price for outfitting a standard 64k main memory/one 160k floppy disk drive IBM PC with the extras will (in the US) set you back approximately ($5-6000), including the price of the PC. A suitably equipped IBM XT running Visi On will cost about $7,500.

This compares with a cost of about $80,000 — $250,000 for installing a complete, multi-workstation, Xerox 8010 network (Xerox does not really market these workstations as stand-alone items, but they are reckoned to cost between $14,000 to $17,000 each), and the $9,995 cost of purchasing a single Lisa (volume purchases by major customers typically lower this to $7,500).

It should be noted that VisiCorp is not alone in attempting to develop a window oriented software package that provides an integrated environment for different applications programs. One other participant in this new market is Quarterdeck Office Systems, a West Coast company that plans to launch a window-based software package called Desq by the time this review appears. The package will cost about $400 and initially run on the IBM PC. The idea behind Desq is far less complicated than the other products we've talked about. Rather than taking two to three years to develop a very sophisticated

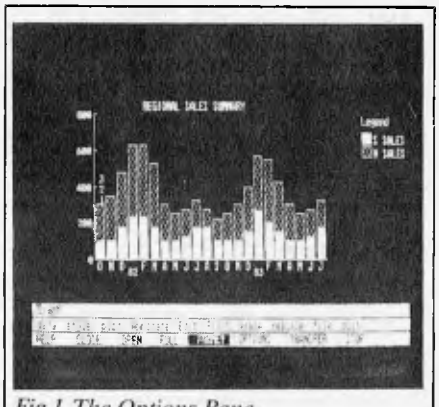


Fig 1 The Options Pane

window-based environment for a completely new range of internally developed application programs, Quarterdeck has simply decided to enable users to integrate 'off-the-shelf' packages of their choice. A prototype Desq system has already shown that it can allow users to cut and paste data between the dBase II relational database and the Easywriter II word processor, as well as between one of the Peachtree accounting packages and the Multiplan spreadsheet system.

At the very start of the Visi On project (it began in 1981), VisiCorp may well have felt it would be the first to market such a package to the 16-bit microcomputer market. However, the launch of integrated products such as Lotus 1-2-3, MBA's Context, and the Apple Lisa soon dashed those expectations, and forced VisiCorp to maintain a presence in the potential market by pre-announcing Visi On.

For the last year or so VisiCorp has been able to show only a limited function demo package, thus giving rise to some criticism and generating all sorts of rumours.

Now let's take a look at how the product actually matches up with those rumours.

Using Visi On

The first intriguing thing one learns about VisiCorp's Visi On and the Lisa is that they were both constructed along the lines dictated by major 'user interface design' studies carried out at an early stage in the development process.

Both studies were extensive, including many stages of naive user feedback, and yet in some ways the two product interfaces are more different than they are alike.

While Visi On is largely dependent on textual menu selections, the Lisa is primarily an icon-based system. While Visi On is to be given extensive 'help text' facilities (when a user is unsure about how to proceed with some function, he or she just selects the 'HELP' function from the menu bar and relevant explanatory text will appear on the screen), the Lisa has virtually none. While Visi On comes with a two-button mouse, the Lisa version only has one (while that may seem to be of just trivial interest to most readers, it is a subject of some religious controversy in the new user interface business — sometimes referred to as 'human factors'). These are just a few of the relative differences between the products.

Starting up Visi On is simple since it resides on a hard disk drive and it is possible to boot the product up automatically from there. The machine we had access to for this review was a Wang Personal Computer with a 10 Mbyte hard disk drive. It is faster than the IBM PC since it uses the 16-bit Intel 8086 as opposed to the PC's 16/8-bit Intel 8088 chip.

It is also a more impressive machine on which to show Visi On since its screen is capable of displaying 800 x 300 pixels once the graphics adapter board is installed. The IBM standard colour screen can only display 640 x 200 pixels.

A two-button mouse was plugged into the machine's RS232 port, and while this

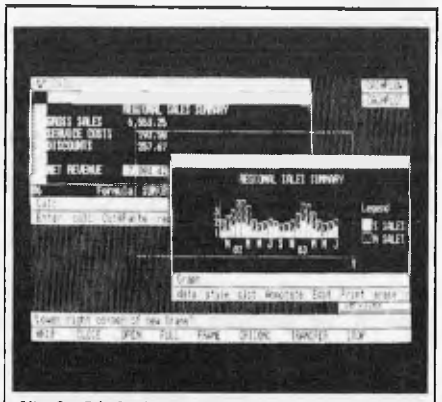


Fig 2 Global menu FRAME command

was of the mechanical type, VisiCorp does intend to ship the product with a more reliable optical mouse. The problem with the mouse on the demo machine was that it could not be used on a polished wood desktop — a piece of paper had to be placed on the wood surface before there was enough friction to rotate the ball bearing accurately enough. Optical mice avoid the lack of friction problem because they have no moving parts; an optical system on the underside of the device detects how many points the mouse has been moved over a special grid laid on the desktop and simple circuitry converts these movements to electrical signals.

Visi On's architecture

Visi On's architecture is very complex, being composed of many intercommunicating layers. But it can be described fairly simply by concentrating on three major levels: Visihost, Visi On itself, and the Visi On activities (see diagram).

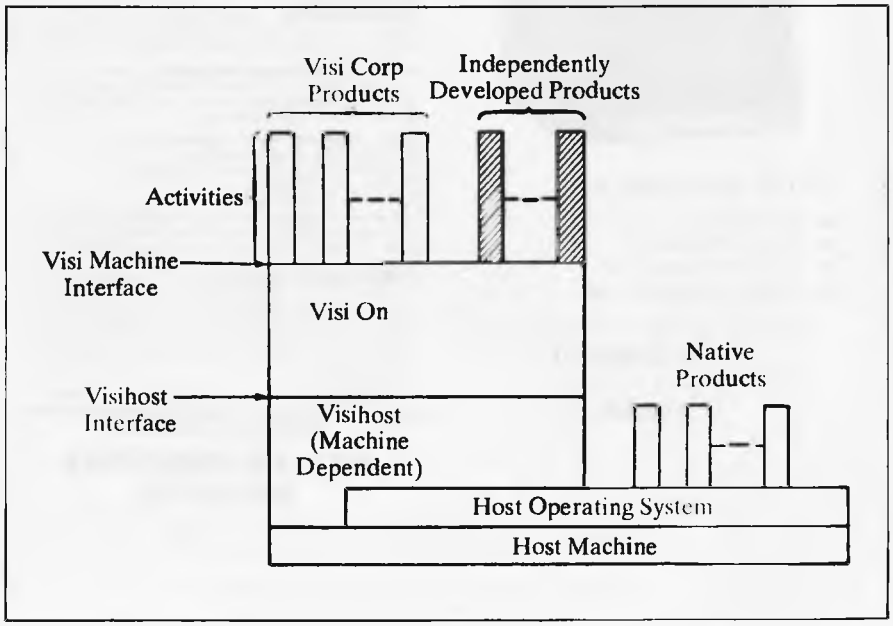
The host microcomputer, such as an IBM PC, will come with an operating system such as MS-DOS. MS-DOS communicates with the hardware through a software layer known as the BIOS, for Basic Input/Output system.

At the lowest level of Visi On there is Visihost, which operates as a type of BIOS between the main Visi On system and the host operating system. Visihost is actually a 30k chunk of code written partly in the C language and partly in assembler language. Its main purpose is to provide Visi On with all the machine facilities it requires, including file opening and closing, etc. Since it is the only part of the Visi On package which contains machine specific code, it is a relatively simple matter to develop machine specific Visihosts which can then carry Visi On in piggy-back fashion to each manufacturer's machine.

Visi On itself consists of about 128k of compiled C language code and data space, and communicates with Visihost via the Visihost Interface layer. Visi On is by far the most complex piece of software to come out of VisiCorp. Its response to users' commands or requests has been determined by what the company calls BITS (Basic Interaction Techniques).

These BITS (there are many of them) categorise the ways in which a Visi On user will typically interact with the application programs using windows, the mouse and the keyboard. They were formalised through a user interface design study VisiCorp undertook at the beginning of the Visi On project.

Above both Visi On and Visihost sit the Visi On activities, or application programs that will be accessed by the user. They are



in touch with Visi On through a layer called the Visi Machine Interface. The first three products to be announced are Visi On Calc, Visi On Word and Visi On Graph — all enhanced versions of current VisiCorp products. VisiCorp intends to add further products to this line-up, including programs to handle database and data communications.

Windows

Before we really get into the detail of how the product works it would make sense to talk specifically about the Visi On windows, since they are very different to those found on the Xerox 8010 and Apple Lisa — in some senses they are like shrunken versions of a traditional application program screen. What this means is that every window is made up of the file contents area attached to which there are a number of lines for displaying menus and/or messages specifically associated with that window.

There are three main parts, or panes, as VisiCorp tends to call them, to every window. Moving from the top of the window down they are:

The window header, or identifier: this is the top part of a window, which is displayed in reverse video, ie, dark characters on a light background. It is there simply as a name tag given by the system (in the case of pre-designed system windows) or the user (whenever a new file is created and given a name).

The contents pane: naturally, this part takes up most of the window's area. The data displayed here is presented in normal video (light characters on a dark background).

The dialogue pane: this is actually made up of two inverse video panes separated by a thin horizontal black line. The top line is referred to as the information line for two reasons. One is that it indicates what stage the user has reached in an application ('DemoWord/Revise' informs that you are working with DemoWord in the revision mode). The second is that it is also used as a message area either to explain the action of a menu command selected from the lower line of the dialogue pane or to flash up prompts and error messages. Each window comes with its own range of menu commands in keeping with the context of the planned work. If you are going to do wordprocessing the menu will have a range of commands like 'delete, copy, move, find, doc-layout', while a spreadsheet will come with a whole different set such as 'formula, label, edit, replace, recalc'.

While there are three main components of the window always visible, there is in fact one more component which has to be purposefully called up by the user called **the options pane.** By going to the main Visi On menu (described further on) the user can select the OPTIONS command and then use the mouse to point at a specific window. The result is that what appears to be a second window attaches itself to the right-hand edge of the main applications window (see Fig 1). Option panes are provided so that the user can review or change application program specific defaults. The cursor can be used to pick any one of the options and the options window then closed.

Once you have two or more windows on the screen, it is inevitable that you will have to move them around or change their size to some degree. Here, Visi On has a far less elegant way of doing the job than Lisa, but it gets the job done. When a window must be re-sized on Lisa, you simply place the cursor at the bottom-right corner and either tug downwards and to the right to make the window bigger, or upwards and to the left to make it smaller. To move a window, you place the cursor on the window title (located at the mid-point along the top edge), keep the mouse button depressed, and then 'pick' up the complete window and 'lay it down' wherever you want to. The operations are very quick.

With Visi On you must use the global menu FRAME command essentially to redraw the window in its new location (see Fig 2).

NEW GENERATION COMPUTER STORE PTY LTD PRESENTS . . .

TECO

12" CRT Display Monitor

★ Low-cost
★ High Resolution
★ High Performance
★ Green/Amber Display

SPECIAL OFFER DECEMBER
ONLY **$199.00**
SWIVEL STAND
$19.95

DATALINE
BY IGITUR SOFTWARE

DATALINE is a new, Australian designed and produced communications system which drives Modem Technology's UDM — 1200 Modem and Novation Cat in the popular U.C.S.D. Pascal Environment* and gives the user a wide range of capabilities for communication with databases and other computers. The range of functions provided by DATALINE include . . .

AUTO-DIAL: Numbers can be fetched automatically from DATALINE's Phone Directory and dialled by the system. All you need remember is the name of the person you wish to ring.

FILE-HANDLING: Pascal files can be sent and received onto a disk and/or printer. All incoming and outgoing information can be shown on the screen so that it can be checked.

PHONE DIRECTORY SYSTEM: You can create an unlimited number of Phone Directories (using extra disks if necessary) each of which can contain up to 127 entries in the following format:

NAME: New Generation Computer Store
ADDRESS: 93 Longueville Road,
SUBURB/CITY: Lane Cove, NSW 2066
PHONE: (02) 427 4780
CONTACT: Mike/George — Sales

Entries within a Phone Directory are automatically sorted into alphabetical order and can be changed or deleted. Each Phone Directory can be protected by a Password.

COMMAND FILE SYSTEM: This allows you to create a file of DATALINE functions which will subsequently be executed simply by typing in the name of the Command File. Any number of such files can be created. Apart from making the system easier for you to use they also enable it to be operated in your absence (e.g. by an inexperienced user or automatically in conjunction with a clock).

FEATURES: Low Cost, High Performance
Australian Developed Communications System
AUTO BOOT AVAILABLE

DEALER ENQUIRIES WELCOME

DATATREE
DATA CASSETTE

DATATREE offers you a professional cassette unit — DATA CASSETTE —which is specifically designed with SQUARE WAVE OUTPUT to ensure 100% data transmission.

DATA CASSETTE also has built-in counter, SAVE indicator, PAUSE and AUTO STOP . . . etc. All these make your data store/recall an easy thing — fast and accurate!

DATA CASSETTE is compatible with ALL KINDS OF HOME COMPUTERS. It's the best choice today and it's at incredible low cost!

SPECIFICATIONS

* Square wave output. 100% data transmission

DATA CASSETTE

Cammon cassette player

★ Stable output voltage 2.5V, no need to adjust.
★ Frequency response: 100Hz to 6.3K Hz ± dB
★ Input/Output impedance: 10K ohm
★ Tape speed allowance: Wrms 0.35%
★ Wow and flutter: Wrms 0.35%
★ Power: 117V AC 60Hz. 220/240V AC 50Hz, or 9V DC 200mA
★ Built-in counter, SAVE indicator, PAUSE and AUTO STOP function
★ Size: 198 x 158 x 55mm, 7 7/8" x 6¼" x 2 1/8"
★ Weight: N. W. 700g
★ Packing: 1pc/box with polyfoam, 12pcs/ctn/1.9'/ 14kgs.

Specifications subject to change without notice

$69.00

NEW GENERATION COMPUTER STORE
93 LONGUEVILLE ROAD, LANE COVE 2066. TEL: (02) 427 4781, 427 4780

After extensive research into the best <u>this</u> world can offer, President is proud to present to fellow Australians what we believe to be the top range of computer systems available on the market today.
Just have a look over the next four pages - we're sure you will agree.

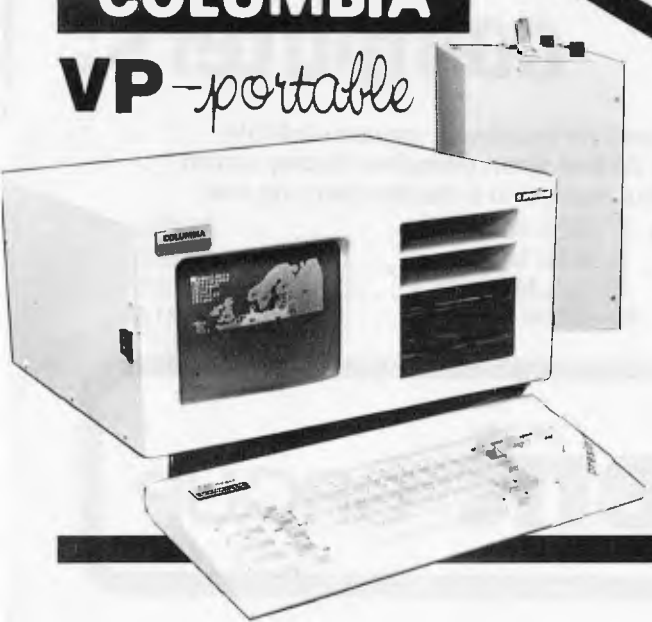
president

COLUMBIA BUILT FOR EXPANSION

This prestigious system gives the best of both worlds. Designed to take advantage of the 16-bit microprocessor generation, we also offer a Z-80 CPU/ CP/M-based 8-bit expansion system. We also include thousands of dollars worth of MS-DOS™ and CP/M DOS™ compatible software with every package. Other features are 5¼" (135mm) floppy disk storage and **IBM-PC**™ compatible software and hardware.

$3,995 (ex. tax)

COLUMBIA VP-portable



Most of the features of the **above computer** presented in a highly portable package. Even the most advanced applications are no problem for VP's sophisticated 16-bit 8088 128K/256K RAM processor. Rugged, lightweight **IBM-PC**™ compatible software and 23cm (9") high resolution screen are built in for ease of operation. The best news of all is the price.

$5,995 (inc. tax)
for Double Floppy System
– 10 megabyte available.

KAYPRO 4

KAYPRO II

KAYPRO 10

The Kaypro family– Australia's widest choice of transportable computers.

$2 500 worth of software included
ALL YOU MAY EVER NEED

- Detachable keyboard for maximum manoeuvrability
- 9" 80 character x 24 line green phosphor display screen
- Weighs just 13 kilos, housed in a durable carrying case
- Prices for Kaypro II (400 K) $3295
  4 (800 K) $3595
  8 (1.6 M/BYTE) $4395
  (with graphics) 10 (10 M/BYTE) $6215

president GROUP

Hey Big Brother

$2495
(inc. tax)

Revolutionary Australian Design

Progress is inevitable

Did you realise that 1984 is just around the corner? Competition is pretty fierce these days, in all walks of life. The Australian company Dulmont are aware of this, and anxious to remain a forerunner of high technology, they have, after extensive research, created the Magnum Macro- Computer – for the business man or woman, the housekeeper, the student, or whatever your vocation – it's your own, long-awaited, personal, portable, affordable secretary.
Designed in Australia, by Australians, for the world – Even George Orwell would be amazed.

1884—1984

MAGNUM MACRO-COMPUTER

Why Macro?

Well, just look at the mammoth storage capacity, massive range of accessories and software, and mighty powerful set of standard features. Optimumly sized, a smaller machine is certainly possible, but would be highly impractical, the keyboard would become non-functional. The Dulmont Magnum Macro-Computer – it's the ultimate combination, never before available in a portable system.

Features include:

- Full size qwerty keyboard with user definable function keys
- 80186 bit CPU processor
- Battery powered (up to 20 hours before recharging)
- Supporting up to 256 K BYTES of CMOS RAM, 128 K of ROM
- 8 line x 80 character liquid crystal display with dot addressable graphics
- Two serial and one parallel I/O port
- Advanced ROM based operating system and resident basic interpreter
- Housing in a very portable package 305 mm x 279 mm x 305 mm
- Weight of less than 4 kg.
- Inbuilt software – word processing financial planner and diary.

Please send me your full colour brochure which provides specifications and explains the Magnum in more detail.

Name . . . . . .

Address. . . . . .

. . . . . Ph . . . . . .

Post coupon to: President Computers Pty. Ltd.
100 George Street, Hornsby 2077 Ph. 476 2700

13 years ago, the President Office Machine Group began, distributing typewriters and calculators. In 1977 we commenced building calculators from S.K.D. kits and followed shortly with a typewriter factory of our very own. It was in 1980 that we made the move to computers, buying design rights to the Australian system Concept II, and committing ourselves to the formidable task of finding the optimum in equipment from a worldwide selection.

TOM COOPER – M.D.

Now, in 1983, President can offer not only top quality computerware, we can offer it throughout Australia with 160 dealer outlets, 400 vehicles and 900 personnel. That's experience totalling around 2,700 years. They'll come to you, to your office, with the President promise of servicing whatever we sell.

president printer

V.S.P. Daisywheel **$690** (ex tax)

Major President Outlets

NEW SOUTH WALES

Computermax
539 Pittwater Road
BROOKVALE 2100
Ph. (02) 93 1383 A.H. 908 1718
Open 8.30-5 Mon.-Fri. 8.30-12 Sat
Contact Max Leonard

Desktop Computers
10 Cowper Street
GRANVILLE 2142
Ph. (02) 637 3062
Open 9-5 Mon.-Fri. 10-4 Sat, Sun.
Contact Charlie Dorn

President Computers
Rear 100 George Street
HORNSBY 2077
Ph. (02) 476 2700
Open 9-5 Mon.-Fri. 10-4 Sat, Sun.
Contact Hugh Burns

Delta Computers
12 Fetherstone Street
BANKSTOWN 2200
Ph. (02) 705 6636 A.H. 639 0248
Contact Wanda Bates Open 9-5
Mon.-Fri. Contact Garry Wylie

Dataspeed
3rd Flr., 355 Sussex Street
SYDNEY 2000
Ph. (02) 267 9999
Open 9-5 Mon.-Fri., 9-2 Sat.
Contact P. Marjot

VICTORIA

H.B.S. Computer House
142 Cotham Road
KEW 3101
Ph. (03) 80 6105 Open 9-5.30
Mon.-Thur. 9-8 Fri. 9-12.30 Sat.

President Computers
Suite 1, 609 St. Kilda Road
MELBOURNE 3004
Ph. (03) 529 1788
Open 8.30-5 Mon.-Fri. 9-12 Sat.
Contact Steve Freeman

The Computer Fair
180 Flinders Street
MELBOURNE 3000
Ph. (03) 63 4324
Open 9-5 Mon.-Fri. 9-12 Sat.
Contact Bill McPherson

Direct Data
1065 High Street
ARMADALE 3143
Ph. (03) 20 6949
Open 9-5 Mon.-Fri.
Contact Peter Koadlow

QUEENSLAND

Cygnus Computer Services
Suite 4, 104 Fitzroy Street
ROCKHAMPTON 4700
Ph. (079) 27 8872 A.H. 27 1794
Open 9-5.15 Mon.-Fri.
Contact David Halsey

President Queensland
416 Logan Road
STONES CORNER 4120
Ph. (07) 397 0888
Open 9-5 Mon.-Fri. 9-12 Sat.
Contact Bill Brown

SOUTH AUSTRALIA

Peterson Business Machines
100 Pirie Street
ADELAIDE 5000
Ph. (08) 223 6333
Open 9-5 Mon.-Fri. 9-11.30 Sat.
Contact Reg Goodhew

Computer Marketing H.W. Pty Ltd
3 Lindley Street
POORAKA 5092
Ph. (08) 262 4168
Contact Don Crago

WESTERN AUSTRALIA

Micro EDP & Hardware
9a/1 Leura Avenue
CLAREMONT 6010
Ph. (09) 384 5511
Open 9-5.30 Mon.-Fri. 9-12.30 Sat
Contact Gary Triffitt

president GROUP

SETTING THE STANDARD

First, you select FRAME with the cursor and are given the prompt 'Frame which window?' You point to the relevant window and press the select button once. Next, Visi On prompts you to indicate the 'Upper left corner of new frame?' with the cursor, after which you press the select button. This action tells Visi On the point from which it is to draw the left-hand side of the new frame. Finally, you are told to point to the 'Lower right corner of new frame?' As you move the cursor down and to the right, a flashing outline appears, allowing you to gauge the size of the new window. The cursor can be moved to and fro until the desired dimensions have been achieved. Once all these actions have been successfully concluded, the old window disappears and its contents reappear in the new window frame. Also, any windows underneath the original one now reappear.

While the differences between Visi On and Lisa here are not catastrophic, it should be said that there are some drawbacks to the Visi On notion of window-handling. It is not so easy to move the currently active window aside to see what is below it — you have to commit yourself to making the above moves or making the other window the active one. In other words you can't peek . . . the up/down roller-blind type of re-sizing on Lisa makes it a simpler procedure to look at documents arranged underneath the current one. Also, moving a Lisa window does not have any effect on its size — by having to redraw the Visi On windows it is a little more difficult to avoid unnecessary alterations.

There are really no major differences between the two systems in terms of how windows are closed. With the Lisa you can click on the window twice and it will shrink back into its icon form and move over to the right-hand edge of the screen. With Visi On, the user selects CLOSE from the global menu, points to the window to be closed, and it shrinks to a nine-character wide rectangle placed along the right side of the screen. This label, or 'brick', is probably the closest that Visi On gets to using a pictorial representation since it resembles a folder on a desktop.

Visi On commands

After booting up Visi On the user is presented with a screen containing the Services box which is shown at the lower right in Fig 3.

Across the bottom of the screen there is the menu line, or what VisiCorp calls the global menu. This global menu is always displayed and always contains the same nine commands in the same order.

The commands are: HELP, CLOSE, OPEN, FULL, FRAME, OPTIONS, TRANSFER, STOP and SAVE. We will

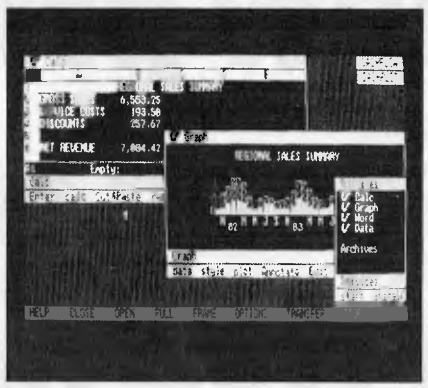


Fig 3 Services

be explaining how these are used during the review, but for the less patient there is a brief description of each command below.

HELP — In line with many other help facilities, this command is used to provide an explanation of any function currently in use.

CLOSE — Used to close, or remove a window from the desktop.

OPEN — Used to open a selected window which is closed, or to shrink a fully-opened window (see next command) back to its previous open size and location.

FULL — Takes a partially open window and expands it to the full size of the screen.

FRAME — Used to re-size and/or re-locate an already open window.

OPTIONS — Used to display a special options window that is automatically attached to the selected application window. In a spreadsheet the options would relate to formula set-up or cell formats, for example.

TRANSFER — Used to carry out cut-and-paste, or information interchange operations.

STOP — Used as a type of 'cancel' key if you do not want to continue with a previously selected command, or as a way of halting long processing tasks.

SAVE — Used to store the current screen image in a file called a workspace. In other words, it saves everything as you left it so that you can resume where you left off.

You select one of these commands by using the mouse. The VisiCorp mouse will be supplied with two buttons; the left button is used to select something on the screen, such as a window or a particular line or character inside the window, and the right button is used to scroll the many vertical and horizontal menus that appear. Whenever a command is selected it is backlighted for visual confirmation. As a general rule, most text selected by the mouse will flip to reverse video, be it dark characters on a light background or vice-versa.

Services

As already mentioned, there is a small rectangular area containing text at the bottom right of the screen in Fig 3. This is called the Services window and it can be likened to the ProFile icon on the Lisa system since it shows the user what applications are currently available. Since it is the first window that a Visi On user will encounter, it's worth going into some detail about its features.

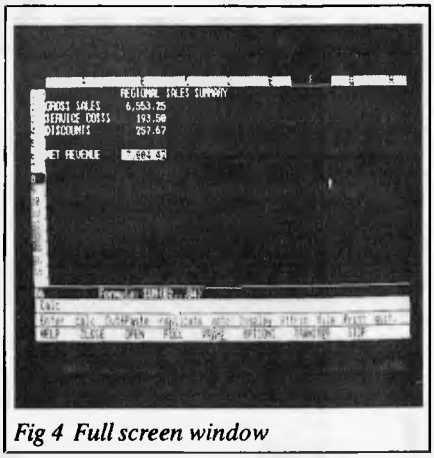


Fig 4 Full screen window

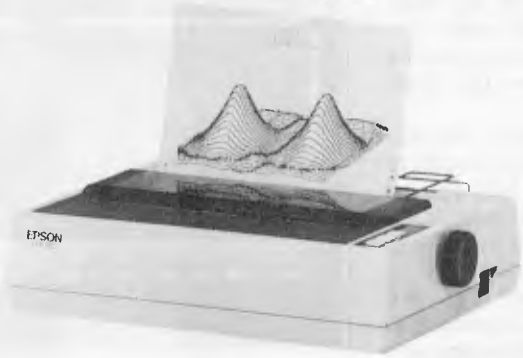
On the Lisa you open up the ProFile icon by clicking on it twice and then selecting whichever application you require; with Visi On's Services window you begin work by selecting the command 'start', scrolling through a list of installed product names (DemoCalc, DemoPlot, DemoWord, etc,) until you locate the one you want, and then pressing the select button again. This causes a prompt to appear requesting a filename (the location is programmer or user definable). Once the filename is supplied, Visi On then opens a window with that name somewhere on the screen.

If you look at the Services window in the photograph you will notice that it is composed of the four distinct panes we described earlier, in the style of the Visi On window. At the top is a header line which simply contains the word 'Services' to identify the window's purpose. The next and largest pane displays the application product names which can be chosen after selecting the start command in much the same way that a Lisa user would 'tear-off' a piece of, say, LisaCalc paper.

The system under review appeared to have a group of programs — DemoCalc, DemoPlot, DemoWord, DemoComm, and DemoData — already installed. As it

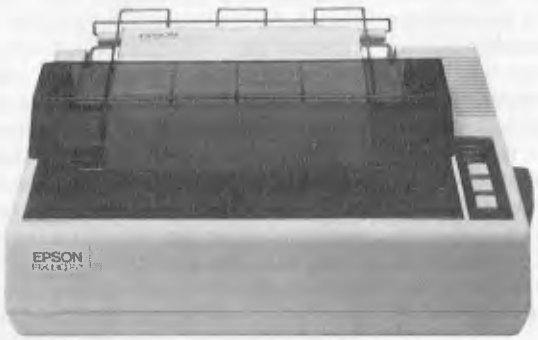
Four new printers from Epson at very attractive prices.

IMM

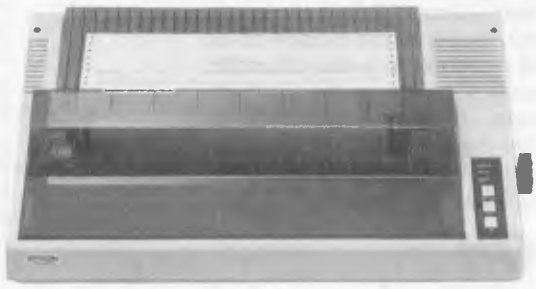


RX-80
NEW PERSONAL PRINTER
Printing Speed 100 cps
$525*

FX-80
NEW VERSATILE PRINTER
Printing Speed 160 cps
$870*



RX-80FT
WITH FRICTION FEED
Printing Speed 100 cps
$615*



FX-100
BUSINESS PRINTER
Printing Speed 160 cps
$1395*

*Prices do not include Sales Tax.

For further information contact your local Warburton Franki office or any of our authorised dealers.

WARBURTON FRANKI

● ADELAIDE (08) 356-7333 ● BRISBANE (07) 52-7255 ● HOBART (002) 28-0321 ● MELBOURNE (03) 699-4999
● PERTH (09) 277-7000 ● SYDNEY (02) 648-1711

turned out, though, we only got a chance to see the first three in the list.

Still within this large central pane, there are three more lines of text marked 'Files', 'Scripts' and 'Workspaces'. While the Files option simply displays a list of all the files created by the various application programs — a directory — , the latter two functions offer the user some special Visi On capabilities.

If a user has some repetitive tasks to do, the Scripts function provides a means by which a complete sequence of commands, including mouse selections, can be recorded and re-run automatically at some later time. To invoke this function the user simply chooses the Scripts menu selection and then goes about his/her business. When the job is finished, the Scripts function is turned off. The sequence of operations are then saved as a named file which can be run whenever required. While this capability is not too unlike the glossary feature available on many word processors which allows the user to type commands into a file almost as if they were programming in a high-level language, the fact that Visi On will do it automatically, and at a much higher level, is a real bonus.

The Workspaces function essentially takes a snapshot of the current Visi On status when the user leaves the system — that is, it notes the current layout of the screen, the contents of the windows, and any other information that is relevant to recreating the image for the user when he returns to carry on with his work. It is a big advance on the way in which some spreadsheets and wordprocessors will simply return you to the last cursor location when you reload a file, and this is, of course, dictated by the desktop metaphor.

The next pane also looks as though it is simply titled 'Services', but it is being employed as part of an actual menu selection area this time. Since the Services window has all the properties of a normal Visi On window, it can be re-sized to display more of its contents at any time. Generally, the application program entries will not be too much longer than those shown, but the two bottom panes will always require a window 30 — 35 characters wide before they really make immediate sense.

Next to the word Services, for example, a small explanatory message will appear every time the cursor is placed over the commands 'start' or 'install', which are arranged on the pane below.

Selecting 'install' will result in the message 'install a new product' appearing next to the word Services as confirmation, for example. In this instance, install is for transferring a new floppy-based application onto the hard disk.

However, other commands will be provided to the right of start and install that will deal with the installation or removal of I/O devices like printers and plotters and exiting from the Visi On environment to the host operating system.

Instead of re-sizing the Services window, a quicker, but more tricky method of reviewing your options is to scroll the start line to the left by placing the cursor on it, pressing the right-hand scroll button, and then essentially 'pushing' the text off to the left by moving the mouse in that direction.

Text can be scrolled at a slow, medium, or fast pace, depending on the magnitude of the initial push. To stop the scrolling motion you lift your finger off the scroll

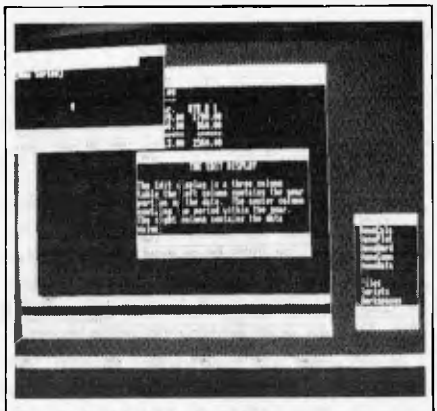


Fig 5 Read Only Text files

button. To scroll to the right you just push

"...the software is well put together and does work..."

PHILLIP COOK – HITACHI PERSONAL COMPUTERS

"These days, it's not uncommon to find software that doesn't live up to expectations.

"That's certainly not the case with Attache. It's a great concept and really does fulfil the 'software to go' philosophy.

"Value for money and the ability to do the job for the price is of major importance. In this area, Attache has considerable benefits."

In an industry renowned for rapid change, Attache is a revolution. The new Attache concept takes software into the truly user-friendly era for the very first time.

Attache's unique software package lets you get a sophisticated commercial accounting system up and running immediately, regardless of your experience, but if you need support, you've got it. Attache is Australia's fully-supported software system.

Your complete 'software-to-go' package includes start-up kit, printed stationery, test company, well-documented manuals and live program diskettes. Neatly arranged in an attache case, of course!

A comprehensive suite of 126 programs ensures that there's one just right for you. Accounting modules may be purchased individually or you can choose from one of the business packs. Categories include accounts receivable (debtors); invoicing/sales analysis; inventory control (stock); accounts payable (creditors); general ledger and payroll.

Design compatibility eliminates duplication as your Attache system grows with you.

Attache software. It's very new and very different. Unfortunately it's not yet everywhere, so call us if your dealer doesn't stock it.

Attaché software to go

Attache Software 275 Alfred St North Sydney
Phone 9298700 Dealer enquiries welcome

the mouse to the right with the button still depressed.

Bearing in mind that we were using a fairly inaccurate mechanical mouse, it nevertheless seemed a little difficult to control the speed of scrolling and therefore spot the required command in time before it was whisked out of sight beyond the window's border.

This problem should be reduced once the user becomes more familiar with the menu layout, and the action of pushing lines or columns of text around. It might also make more sense to maintain a fairly wide Services window so that at least three or so commands can be seen at one time.

Application

We next selected the DemoCalc application from the Services menu and opened up an application window.

The size of the initial window is something that the user can set, within certain limits. It makes no sense, for example, to have all the windows appear so small that it is impossible to see their contents, or so large that they obscure all other windows already on the desktop.

Returning to the global menu, we decided to use the 'FULL' command and make the DemoCalc window grow as large as the Wang screen would allow. It is likely that this will be the preferred way initially to create documents/spreadsheets/graphs since the smaller windows would require too much scrolling of contents. Having a number of windows on the screen simultaneously only generally make sense if you are intending to transfer data between documents that are pretty much complete, or if you are visually comparing graphs or spreadsheet/document layouts.

A full-screen window looks exactly the same as a smaller window, but the two sections of the dialogue line lie directly on top of the global menu line at the bottom of the screen as shown in Fig 4. A wide selection of menu commands are shown, and there is now ample space for prompts and errors messages to appear.

At this point, there is little visual evidence (other than the global menu) to differentiate Visi On from the way, say, Lotus 1-2-3 displays menu selections and screen layouts.

The key difference, though, is the fact that you can use the mouse-controlled cursor to handle all sorts of data manipulations.

Transferring data between windows

It doesn't take much to develop a software package that can put windows up on the screen . . . the real problem is to make it possible for the user to transfer data between such windows in a reliable, common-sense manner.

As with the re-sizing and moving of windows, Visi On's method of data interchange differs from that on the Lisa. The main difference is that Visi On requires you to answer prompts, while Lisa simply requires you to follow the ever-present 'cut and paste' procedure.

A simple transfer might be to take a row of new totals from a spreadsheet window and place them in a graph window so that last month's sales figures, for example, are updated. This is a facility which business planners will find very visually impressive.

To accomplish this with Visi On you must do six operations, as shown below:

a) first, you select the TRANSFER command from the global menu;

b) next, you answer the prompt 'Transfer from which window?' by pointing to the spreadsheet window;

c) Visi On then begins to steer you into the specific data to be transferred by prompting 'Start of region to transfer?'. You point to the beginning of sales total line;

d) the next prompt, 'End of region to transfer?' is answered by pointing to the end of the sales total line;

e) the penultimate step is to answer the 'Transfer to which window' prompt by pointing to the graph window; and

f) finally, you complete the whole operation, answering the prompt 'Where to put transferred region?' by pointing to the graph area in the contents pane.

The result of data transfers depends on the nature of the source and destination windows. If the source is a spreadsheet and the destination window is a graph, then the transferred data will be automatically 'absorbed' by the graph system and the screen image will be updated.

If the new incoming data bears no resemblance to the previous graph layout data then the graphing system will 'do the best it can', as one of its designers said, to try and accommodate the situation. Essentially, it will revise the graph grid so that the tallest graph element is accommodated on the y-axis, and a suitable range is allowed for along the x-axis. Any legends or other text specific to the original graph are removed.

All transfers, be they 'application to like application' or 'it will do the best it can' types, are handled directly by Visi On in what might be called its go-between mode.

Once all the transfer prompts have been successfully completed, Visi On first takes a look at both the source application program and the destination program to ascertain what data types can be moved between them, given the contextual rules relating to the procedure.

These rules employ the common-sense logic that if you are transferring data between wordprocessing documents, or between spreadsheets, then you can transfer everything. But if you want to transfer from a spreadsheet to a wordprocessing document then it is not necessary to go the whole hog — formulas, format codes, and all other spreadsheet paraphernalia will be stripped off.

During the brief time we had access to the prototype Visi On system it was not possible to indicate what the effects of each and every data transfer would be, but those that we did observe were more than satisfactory.

The HELP system

Traditionally, most help systems have just been read-only text files that can be called up by hitting the '?' symbol or pressing return after placing the cursor over the menu command 'HELP'. Before displaying anything, the program checks to see what stage the user is at and then goes off to find the most relevant help text file on the disk. This, all too regularly, is a fairly limp paragraph or two that generally tells you what you have already had to guess for yourself.

While this approach might suffice for fairly simple program environments, a more adventurous system such as Visi On requires something more tailored.

VisiCorp has come up with the idea of creating a network of read-only text files (hypertext in company jargon) that can start off at a fairly simple level and lead the user to ever more comprehensive instructions (see Fig 5). At the top level there are files which describe how Visi On itself can be used — a table of contents more or less; at the application program level there are more task specific texts.

When we did this review Visi On's help facility, invoked by selecting the global menu command HELP, came with four choices. 'overview' calls up new text that is more general than that currently selected. 'Contents' simply brings back the HELP system's table of contents list. 'Back' returns the user to his/her exact location in the previously listed screen of help test. 'Quit' enables the user to back out of the help mode when enough information has been gathered.

A rather good feature of Visi On is that it not only allows you to move around a collection of help texts in a controlled manner, but once you have found a group of help texts which are going to be used repeatedly by yourself, or others during their training, it allows you to save those texts as a group of closed windows at the right of the screen. These problem specific windows can then be operated anytime trouble occurs.

Archives

A big omission on the Visi On system we reviewed was that there appeared to be no way of correcting mistakes, as when the

THE CHIPS ARE DOWN!

JOHN SANDS ELECTRONICS INTRODUCES THE PERSONAL COMPUTER THAT OUTPOWERS, OUTFUNCTIONS, OUTCOLOURS, OUTCOMPUTES AND OUTSELLS EVERYTHING IN ITS CLASS

AND $329 SAYS WE'RE ABSOLUTELY RIGHT!

Now you don't have to wait until tomorrow to get your hands on tomorrow's technology!

The John Sands Sega SC3000 Personal Computer is so far ahead of anything else in its class, that waiting for something better or different to come along could see you waiting for many, many moons.

At just $329,* this computer makes anything in its price range appear totally inadequate. In terms of power (32K ROM and 32K RAM – expandable to 48K!), in terms of high resolution display (256 x 192 dot screen matrix and 5 x 7 character dot matrix), in terms of colour (16 separate colours and 225 colour hues), in terms of sound (3 sound voices over a range of 5 octaves), in terms of the ability to obey its BASIC Language (including 48 single key-stroke functions), in terms of graphic display (32 graphic sprite planes), in terms of its capacity to interface with a wide range of peripherals including 2 Joystick Sockets, Games Cartridges, Colour Plotter/Printer, Floppy Disk, Modem Communication, Data Cassette (using any audio tapeplayer), TV Monitor Port and switch for home TV connection, and in terms of ease of use, no other computer in its class can hope to match the John Sands Sega SC3000.

At this very moment, you have the choice of 14 Games Cartridges, a MUSIC Cartridge, and a BASIC III Cartridge with additional memory. Others will be added at the rate of at least one a month.

With your John Sands Sega you enter new worlds of education, fun, music, graphics, home budgeting, personal and business computer functions.

See the John Sands Sega SC3000 Personal Computer today – at selected retailers throughout Australia. Now there's no point in the world in waiting for tomorrow.

Available at all leading department and computer stores.
*Recommended retail price.

John Sands
SEGA® SC3000 Personal Computer

EVA1318JSE/R

wrong file is inadvertently deleted. With Lisa, a deleted file is temporarily placed in a holding area represented by the 'trash-can' icon. According to Kurt Lynn, product manager for Visi On products, the Archives facility on the Visi On system will provide a similar capability, but for maybe up to as many as ten files at a time.

Since the Visi On development team was carrying out a major revision of the file handling system associated with the

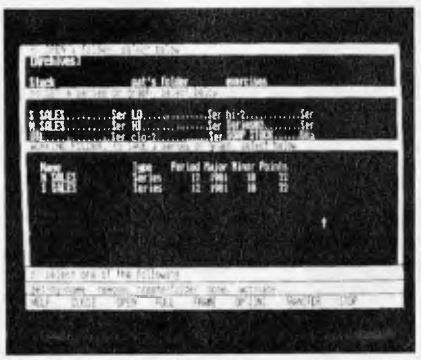


Fig 6 Archives Function

Archives option while we were at VisiCorp's California headquarters, they were not in a position to discuss the matter too deeply. All Lynn would say is that by selecting Archives from the Services window — it will probably appear in the lower part of the window along with Files, Scripts, and Workspaces — a user will be able to go back in and undo files' deletions, among other things.

Visi On does not provide any equivalent to the 'revert to previous version saved X minutes/hours ago' option available on Lisa. This is unfortunate since there are times when it is quite possible to mess a file up so badly that it must be dumped rather than re-worked, and a previous version recalled.

Conclusions and comments

A few weeks after we were able to examine the prototype version of the product, VisiCorp contacted us with the news that a more complete Visi On installed on an IBM PC was ready for demonstration. We were able to go back for additional information on the product and for answers to a number of questions that arose from the first visit.

The first time around it was difficult to come up with a firm conclusion about whether or not Visi On would meet the expectations had been raised for it.

The prototype we saw was missing many features, including some quite fundamental ones, either because the company wanted to keep them under wraps or because they were just not ready. At the superficial level, the prototype could load and run files and exhibit some of the behaviour you would expect — but not enough to give the feeling of security and productivity.

The Wang PC-based Visi On ran quickly, but it certainly wasn't burdened by large files. Nor was it subjected to the many other stresses a commercial version will have to endure.

Originally we felt that there could be some cosmetic improvements to the design of the windows and the 'half-tone' background/desktop, too. At some points it seemed that the screen was overly cluttered; after some thought we determined that this was because of a design decision by VisiCorp, rather than pixel resolution, ie, because there is so much text on the screen VisiCorp decided to put all menus and window identifiers in reverse video (dark characters on a light background), while the user data, that is the applications, are presented in normal video (light characters on a dark background). Tied to the fact that there is a minimal window border, it would take some time to distinguish immediately the work text from the Visi On text. The point, however, is not are the windows pretty but are they useful?

On taking a second look at Visi On we noticed that it had been speeded up quite dramatically due to the introduction of a full virtual memory management system and that some cosmetic improvements had been made to Visi On's visual interface. Although it was a fairly minimal change technically speaking, the use of a new, leaner, typeface has really made the windows and the many menu lines look much cleaner and crisper.

Also, the Services window is now more distinctive, since the simple 'Visi On Word', 'Visi On Calc' and other application product names listed within it have been replaced with the more aesthetically pleasing 'V Calc', 'V Graph', 'V Word' and 'V Data'. The 'V Data', by the way, refers to an as yet unannounced relational database product that VisiCorp intends to release before the year end. It will actually be called Visi On Query and will feature a proprietary file access method.

Observant readers will note that although we earlier explained that the global menu has the nine commands HELP, CLOSE, OPEN, FULL, FRAME, OPTIONS, TRANSFER, STOP, SAVE, the photographs shown here show that the SAVE command has been deleted. This is because that command is now being implemented via the Archives feature (explained in more detail below).

Another problem with the windows is being addressed; when you have two or more windows on the screen and they do not overlap, it is difficult to tell which one is the active window. With the commercial version, the user will be able to identify the active window far more easily since it will always have an extra bright border drawn around it.

It is clear that VisiCorp still intends to

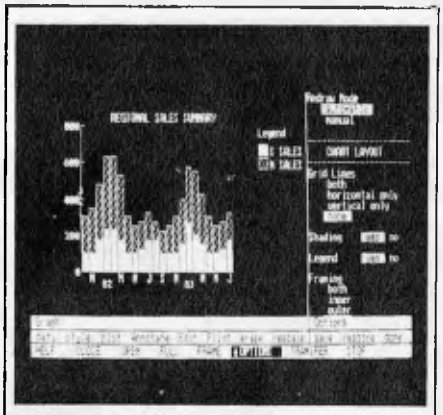


Fig 7 FRAME command

meet the late October launch date — indeed, most of VisiCorp's newspaper and magazine adverts (including those for the recently announced VisiCalc IV system) carry some mention of Visi On's impending appearance. Unfortunately, the product will not appear with all the promised features.

A notable absentee will be the Scripts feature mentioned earlier, which allows users to set up special command files that will automatically repeat some tedious task; logging onto a remote database or formatting a spreadsheet in some preferred manner, for example. According to Kurt Lynn, product manager for Visi On, the Scripts feature has proved to be a far more complex facility to implement than had at first been envisaged. Consequently, the whole Scripts component of Visi On is being reworked and will probably not appear until the end of the year.

In its own way, though, the Scripts system is currently helping VisiCorp designers complete the Visi On system in general far quicker than might have been the case. In one large room at VisiCorp's San Jose headquarters, a number of IBM Personal Computers have been programmed by means of the Scripts system to act as if they were bona fide users. Output from these PC's is then fed into another IBM Personal Computer which is running the Visi On system. Event or error trapping software keeps an eye on the proceedings, making sure that all problems and, hopefully, their causes are recorded for later attention by software engineers. In this way, said Lynn, weeks of work can be reduced to less than a day.

Earlier in this review we gave some details about the 'Archives' function, stating that it was not quite complete at the time of our initial visit. While we did get to see the Archives function in action the second time around, it was still not totally implemented.

Fig 6 shows the type of screen that appears when you select the Archives

FOCUS ON VISI ON

function when in the 'V Graph' application.

The Archives screen, or 'space', is split into three sections: the main folder level (containing the filename's Stock, pat's folder, and exercises); an area which contains the Visi On equivalent to jottings (containing S SALES . . . Ser, N SALES . . . Ser, and SOAP STOCK . . . Gra, etc); and, finally, the Working Folder area where the contents of any of the above can be displayed (the contents of the small files S SALES and N SALES are listed). To select a folder you simply point to the relevant name which is then backlit.

To be frank, we weren't incredibly impressed with this feature when compared to the many other aspects of Visi On, but Kurt Lynn did indicate that further work was taking place to smooth out the way the Archives facility was presented to the user. 'We have been around and around in circles trying to decide whether Archives was even the right name,' said Lynn. 'We've looked at the possibility of calling it the file cabinet area, the holding or storage area, and even the library, but right now our tests seem to show that Archives is the closest name to the image we want to give.'

It should be noted that the second Visi On system, while it was generally a much better behaved product than its predecessor, did crash now and then because of what Lynn described as 'known gotchas'; some had already been dealt with, others were being tackled.

The new breed of 16-bit micros still need a powerful, reliable, yet simple to use interface if they are really to fulfil their potential in the business world. This could make Visi On a big hit. Moreover, a noteworthy group of companies has committed large sums of money to help develop Visi On for the personal, PC-to-mainframe, and professional workstation environments. They have a vested interest in seeing the product succeed.

Prices

Visi On System—$495
Two-button optical mouse—$250

Visi On Applications
Visi On Calc—$395
Visi On Word—$375
Visi On Graph—$195

Upgrade prices for current VisiCorp customers
VisiCalc to Visi On Calc—$195
VisiCalc Advanced Version to Visi On Calc—$50
VisiWord to Visi On Word—$50
VisiPlot to Visi On Graph—$50

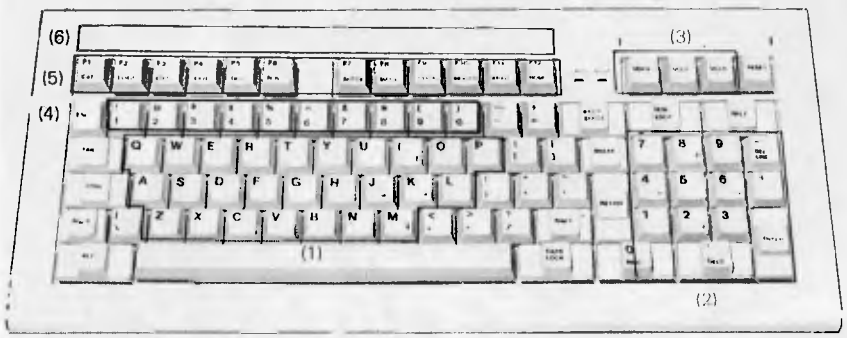
'124 kbytes of expandable memory and still you can't remember my birthday!'

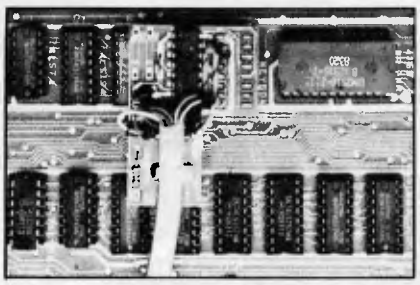
180 FLINDERS STREET,
MELBOURNE
TEL: 654 1327

PHILITRONIC

TRADING HOURS
MON — WED 9am — 6pm
THUR— FRI 9am — 9pm
SAT 9am — 1pm

THE BOSS-1 KEYBOARD IS SPECIALLY DESIGNED FOR APPLE-II* PERSONAL COMPUTER





Connecting with a serial/parallel board, Boss-1 keyboard unit can be a peripheral of Apple II computer to make operation more efficient and convenient.

1. Standard typewriter layout with upper/lower case and auto repeat; each alphabetic is built-in two layer one key basic commands, total 52 commands.
2. 14 keys numeric pad with 8 screen editor function keys.
3. User-defined function keys open define, close define, clear define.
4. 10 keys for storage max. 60 character user-defined program.
5. 12 function keys contain auto line number, key click sound and 12 specified codes for the professional designers.
6. Attached label to print contents of user-defined program.

Dimensions: 184mmx400mmx33mm
Weight: 1.6 kg.

PRICE: $288 + TAX

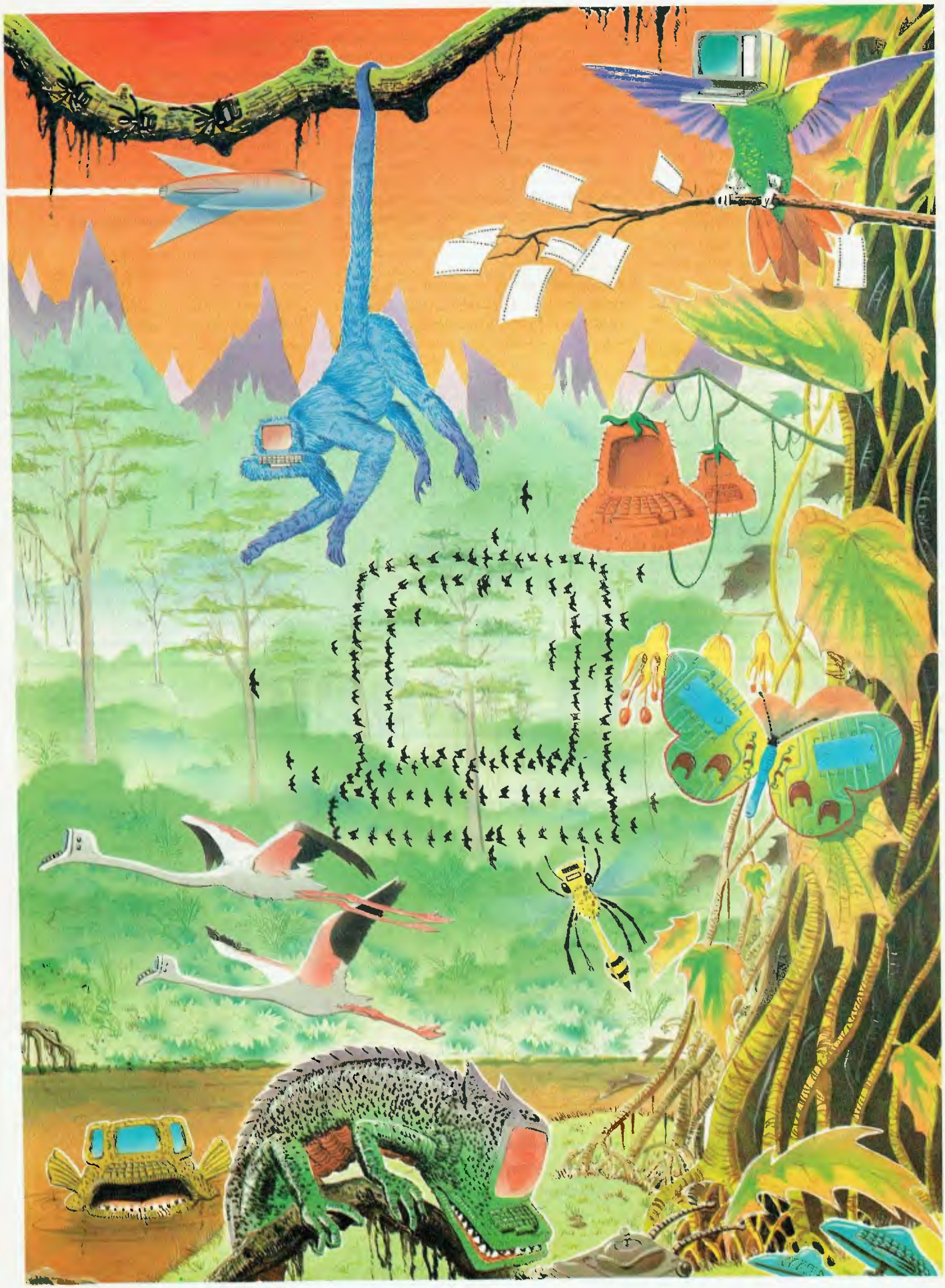
MAIL ORDER & BANKCARD

QUALITY MEMOREX DISKETTE

5¼"	BOX OF 10	8"	
SSSD	$33.00	SSSD	$45.00
SSDD	$37.00	SSDD	$46.00
DSDD	$45.00	DSDD	$64.00

PRICE PLUS TAX

5 Year Warranty on Diskettes



GARDEN OF EDEN

Andrew Jones asks why the innovative computer industry resorts to eponymously naming its inventions.

It's funny how trends start.

Once upon a time — say, twenty years ago — when you wanted to wash your hair, you went down to the shop and bought a bottle of spruced-up detergent, which did the job perfectly well and left your hair shining, golden, silky and all those other things that shampoos are supposed to leave hair. That was fine for everyone except the marketing men, who did not see in such simplicity the ideal ongoing hair-cleansing scenario.

Suddenly shampoos became medicated, oiled, creamed, emulsified, and/or fitted with chemicals (sorry, ingredients) for dry hair, greasy hair, normal hair (a vanished breed), problem hair, grey hair and baldness. This was just the beginning; the rapidly-growing number of manufacturers soon decided that more was needed to really satisfy the customer. Now, as I wander through supermarkets, I sometimes wonder whether I am in a chemist shop or a delicatessen.

Shampoos come in a range of flavours that puts ice-cream and chips to shame. You can drench your head in Rosemary and Thyme, Lavender, Pineapple, Hazelnut, Oil of Mink (I wonder how they get it out?), Alpine Herbs, Lemon, Oat Milk, and even (God help us!) Bran and/or Wheatgerm.

Whether this really does anything more for your hair than some post-war 'Hairo' is debatable. That these shampoos sell is, I suppose, self-evident.

However, I hear you cry — what has this to do with microcomputers? Is it relevant? Does it relate? Well, yes, at least peripherally. For the point at issue is the meaningless way in which some products become tagged with labels which bear no relationship at all to their function: and, in particular, the burgeoning natural history of the micro.

When it was just the Apple, one could stand it. It doesn't seem to have much relevance to data processing, but at least those famous US garage mechanics managed to resist the temptation to invent some weird phrase to fit the acronym, such as Automatic Personal Processor and Linked Electronics, or Amazing Profit Potential for Lapsed Electricians. This in itself was a remarkable and laudable departure from normal American corporate practice, although I notice that the company has not shown the same restraint over the Lisa (or should it now be LISA?).

But now! Ah, the bountiful goodness of nature. The average micro mag — not excluding this honourable publication — reads rather like Yates seed catalogue, with The World About Us thrown in for good measure. Browse through the pages and you will find Oranges, Apricots, Pineapples and others. The Peach might have spawned the Peachtree, but this is a woodland plant and is presumably barred from the neat rows of the Apple Orchard. Yet further afield, a quick search of the kitchen garden (Thought: Kitchens Inc would be a good name for a company; think about it) will reveal an abundance of Sage, presumably intended to save you thyme . . . sorry.

'With all this forestry, shrubbery and fruit about, the appearance of a matching fauna seems in accordance with ideas of evolution.'

Bonsai is rather subtle, but I suppose it makes sense to fit all this greenery into as small a space as possible, especially trees which apart from all the rest have an honoured place in software design. With software trees come branches, roots, leaves and also root nodes, which remind me of something to do with peas and beans in 5th Year Biology.

With all this forestry, shrubbery and fruit about, the appearance of a matching fauna seems in accordance with ideas of evolution. Tigers stalk through the greenery, searching desperately for well-tooled hunters to despatch them; little Turtles with inky shells bathe amid the Swans, while overhead Wasps buzz, Ravens croak and Albatrosses (ouch!) glide serenely. Just over the border of strict reality are the strange and faraway lands where the immortal Pheonix rises from the crashes.

And down in the underbush, of course, are the Mice. There are two different breeds: one seeks the way out of the jungle in the shortest possible time (often becoming neurotic as a result) while the other rolls around in Hitler fashion on one ball, controlling things. Despite this reproductive disadvantage, and in true murine fashion, the second sort seem to be breeding like . . . like . . . who said Rabbits?

I suppose I could be accused of overreaction. After all, poetic imagery is no bad thing *per se*, and is notably lacking in names like HX-20, PC, M20, ZX81, MB16001, 64 or TI00/4A. Nor is it easy to think of a good name, as I can testify after spending a fruitless (sorry!) three weeks trying to find a name for a new computing series. But for something as futuristic and — to many — science fiction-like as computers one would expect a host of SF-type names (like Sirius), but these are in fact, in the minority. The other sort of name famed in such as 2001 and Asimov's robots is the name formed from initials; but apart from the VIC it is hard to think of any. Such names are logical; but where the fruit, veg and livestock come in apart from allowing shocking puns by feature writers — remains a mystery.

However, since this trend has irreversibly stuck, perhaps it should be extended more realistically. The Strawberry, for example — despite the fact that mine are full of bugs and usually end up in a jam — would be ideal for a micro designed for use in nets. Mushrooms — apart from sometimes having magical qualities and causing hallucinations — are renowned for growing from what is politely referred to as organic fertiliser, and should be worth consideration by those manufacturers who advertise peripherals which they haven't actually got around to making.

The Orchid blossoms only briefly and dies as soon as it gets onto your desk — someone *must* be able to use that. In the animal world, there is the Bat, for serious attention by various mail-order suppliers who fly by night and move very fast. And one could (but certainly won't) make a humorous remark about the characteristics of an Australian foray into this trendy nomenclature: the MicroBee. Just glancing through Webster's description of the insect reveals up words like sting, bumble and that awfully sticky substance, honey.

I could go on, but for two factors. One is that any name I dream up is likely to be on the market by the time this reaches print. And, besides, you might have more fun making them up yourself.

If not, don't worry too much. However poor or groan-inducing your ideas are, someone, somewhere in California, Tokyo or elsewhere is thinking of something much, much worse . . .

arcompacific

COMCOM AA30333
ARCHIV AA44187
TO GERARD KOHNE A.P.C.

STOP PRESS

URGENTURGENTURGENTURGENTURGENTURGENT

DBASE2 RUNTIME NOW AVAILABLE RPT

DBASE2 RUNTIME NOW AVAILABLE

CONTACT ARCOM PACIFIC (07) 523862
RPT (07) 523862

N.B. ARCHIVE COMPUTERS BRISBANE S/W
DISTRIBUTION DIVISION NOW
CALLED ARCOM PACIFIC.

STOP PRESS

MANY TKS MARTINLACK
ARCHIV AA44187
COMCOM AA30333X

THE NEWS IS OUT

NOW CALLED ARCOMPACIFIC

P.O. Box 13, Clayfield Q 4011 ▪ Telex AA44187 ARCHIV ▪ Phone (07) 52 3862
252 Abbotsford Rd., Mayne Q 4006 AUSTRALIA ▪ International + 61 7 52 3862

MITSUBISHI ELECTRIC

SV-1290X 12" GREEN MONITOR

Mitsubishi Electric's leadership in CRT and TV technology lies behind this unit, with its rapid, accurate and highly legible display of the most complex alphanumeric or graphic data.
Note the advantages:

- Sharp focusing and wideband circuitry give high resolution display. Band width 25 MHz (TYP).
- Low-distortion deflection circuit and generously rated high-voltage power supply ensure accurate display.
- Efficient, effective design and rigorous quality control make for high reliability.
- P31 (green) phosphor type.
- Black, non-glare screen.
- Attractive, modern design, equally suitable in the factory, office or home.

CALL US FOR SPECIAL CHRISTMAS PRICE

HITACHI

13" HIGH RESOLUTION R.G.B. COLOR MONITOR CM-1470P

- Resolution: Hor. 640 dots; Vert. 400 lines, 0.43 dot pitch matrix, 2000 character display (80 char. x 25 lines).
- Video input — R.G.B. TTL level (positive)
- Horizontal and Vertical Sync. — TTL: level (negative).
- 7 Colours: Red, Green, Blue, Yellow, Magenta, Cyan, White.
- Bright display and low distortion ensured by high performance deflection yoke and efficient power supply.
- Scan frequency: Hor.15.75 KHz; Vert.60 Hz.
- Easy to use controls.
- Dimensions 433W x 375H x 386D.
- Excellent for both home and office microcomputer systems.

INTRODUCTORY PRICE $830*

MITSUBISHI ELECTRIC

DISK DRIVES

CALL US FOR SUPER COMPETITIVE PRICES

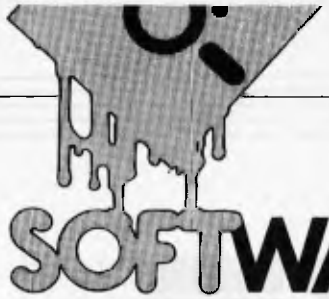
- M4853 Slimline 5.25 inch DSDD 1.0Mbyte Unformatted
- M4854 Slimline 5.25 inch DSDD 1.6Mbyte Unformatted
- M2896-63 Slimline 8 inch DSDD 1.6Mbyte Unformatted

FLASH! WE ARE NOW AN AUTHORISED COMMODORE DEALER. CALL US OR DROP IN FOR KEEN PRICES ON VIC20 AND COMMODORE 64.

Microstore

6D Villiers Street
North Parramatta, NSW 2151
Phone 683 3922 Telex 74654

Counter sales welcome — bring cash or Bankcard.
Mail orders also gladly accepted.
*Plus 20% Sales Tax if applicable.
Prices do not include freight.



WHICH SPREADSHEET?

LOTUS 1-2-3

Mike Liardet evaluates an all singing, all dancing spreadsheet system, which has been a top seller in the US since its release.

The three cornerstones of the microsoftware industry are wordprocessors, information managers and spreadsheet systems — there must be very few disk-based micros without at least one of these 'big three' in regular use. In spite of this it is still comparatively rare to find a big name in the software world offering all three of these products. (One notable exception would be MicroPro, which for some time has offered Datastar and Calcstar along with WordStar). It is even rarer to find these three products completely integrated with one another.

Anyway, over the last few months I have been subjected to persistent rumblings from various contacts in the trade, no — not caused by heavy lunches, but by the excitement generated over a new spreadsheet system which manages to integrate all of the big three functions with graphics thrown in for good measure. Called Lotus 1-2-3, this product has turned over $12 million in its first six months in the States, and is now poised for a similar onslaught of the Australian market.

Basically Lotus has managed to produce a sort of software Holy Trinity. Unlike, say, MicroPro's offerings, we are not faced with three distinct products which, somehow or other, can be made to link with one another — we have a single product that can be used in three different ways. In fairness to 1-2-3's future rivals (there are none at present!), we should point out straightaway that 1-2-3 is rather weak as a wordprocessor although great enhancements in this direction will be arriving early next year. In fact Lotus prefers to proclaim the spreadsheet-graphics-information management aspects of the product, but nonetheless it can be used for simple text processing.

Readers can certainly look forward to more products of this nature in the months to come: Apple's Lisa and VisiCorp's Visi On, although not yet available, are nonetheless pointing the way for the future. Incidentally, Lotus has got there first, with its admittedly less ambitious offering produced in less than 18 months and with just a six-man programming team — in stark contrast to Apple's putative 200 man years for the Lisa software.

Readers who are primarily interested in information management or word processing software should bear in mind that 1-2-3 is first and foremost a spreadsheet system. Although it has extra facilities, the basic environment is that of the spreadsheet, and so obviously it is not the very best option for exclusive word or information processing. But whichever of the 'big three' you are interested in, 1-2-3 makes it very easy to ignore completely the bits you do not need. And the whole package is not so extortionately priced ($895) that this seems particularly useful.

'Basically Lotus has managed to produce a sort of software Holy Trinity. Unlike, say, MicroPro's offerings, we are not faced with three distinct products . . . but a single product that can be used in three different ways.'

Only one more point before we launch into the evaluation itself: Lotus has unfortunately gone along with the current American obsession with the IBM PC and not (yet) bothered to implement it for anything else — no problem over that side of the Pacific, but all the other 16-bit micro owners here are going to need a little patience.

Boxing — IBM-style

1-2-3's packaging is definitely designed to blend in with IBM's. A single stout manual is provided in, yes, you've guessed it, an IBM-style library box: very similar size, proportions and colour scheme. Fashions in software packaging seem to change more rapidly than those in the rag trade. I can now report that IBM-style library boxes are definitely *de rigeur*, whereas simulated leather ring binders, spiral bindings and other archaic paraphernalia are simply *passé!*

Apart from the manual, the box contains a quick reference booklet, a plastic function key template, three master disks and one backup disk. The three master disks respectively contain the core of the 1-2-3 system itself, the graphics software and various tutorials. Only the 1-2-3 system disk is uncopiable, and so a backup is provided for it.

Getting started

Lotus has placed the startup instructions right where I like to see them, on the first page of the manual, even before the contents page. And just in case anybody has any trouble finding them, the instructions are clearly labelled with 'Read This First'.

The two or three pages following give you all the information you need when you have first opened the package, including a contents list, minimum hardware requirement, and basic installation details.

Since 1-2-3 is produced exclusively for the IBM PC, installation is very simple and there is no need to set up VDU configurations or whatever before startup — it is all ready and waiting to roll with the PC configuration.

For each of the three disks provided (plus the backup disk of the uncopiable core of the system), it is necessary to run a program called INSTALL. This merely transfers the operating system from the DOS disk (originally provided with the PC) onto the Lotus disk itself. As with most

C-TECH pty.ltd.

COME INTO OUR SHOWROOM AND TRY THE COMPUTERS FOR YOURSELF. WE DON'T BELIEVE IN HIGH PRESSURE SALES, SO YOU CAN RELAX AND INFORM YOURSELF

NEW CHAMELEON

8-bit and 16-bit processors: Standard
128K bytes RAM: Standard
IBM-PC® and CP/M-80® compatibility: Standard
Word processing and spreadsheet software: Standard

SPECIFICATIONS:

STANDARD CHAMELEON — HARDWARE
Processors: 8088 — 16 bit (IBM-PC compatible), Z80A — 8 bit
RAM: 128K bytes (expandable to 256K)
ROM: 8K bytes (expandable to 48K)
Disk: Dual 160K byte 5¼" disks (IBM-PC compatible)
Display: 9" CRT with green phosphor
I/O: One serial RS-232 port, One parallel port
Keyboard: 83-key (IBM-PC compatible) with 10-key numeric pad and 10 function keys
Graphics: Black and white — 640 x 200 or
320 x 200 resolution, Color (on separate color monitor): 320 x 200 resolution, 16 color, 4 at a time — Portable

CHAMELEON PLUS — HARDWARE
As for Standard Chameleon including:
RAM: 256K bytes
Disk: Dual 320K byte 5¼" disks (IBM-PC compatible)

STANDARD CHAMELEON — SOFTWARE
Operating system: MS-DOS (IBM PC-DOS compatible)
Development language: MBasic-86 (IBM compatible)
Word processing: Perfect Writer
Spreadsheet: Perfect Calc

CHAMELEON PLUS — SOFTWARE
As for Standard Chameleon including:
CONDOR DBMS — GWBasic Communications Package

OPTIONS
CP/M-80 8 bit operating system
CP/M-86 16 bit operating system
GWBasic (advanced graphics Basic)
Additional 128K RAM internal
Hard disk
Double sided floppies (320K bytes each)
A/D port
Serial port for bisynchronous communications
IEEE-488 bus
Chameleon expansion unit (IBM-PC board compatible)
*Additional memory (up to 704K bytes total) *Additional functions (IBM-PC expansion cards)

NEW DAISYWHEEL PRINTER FROM MITSUI

SPECIFICATIONS
Printing speed: 18 characters/second
Daisywheel: Triumph-Adler compatible ("Drop-in" system)
Number of printing characters: 100 characters
Spacing: 110 characters under 10 pitch. 132 characters under 12 pitch. 165 characters under 15 pitch. 82 to 220 characters under proportional spacing mode
Character spacing: 1/120 inch min
Line spacing: 1/48 inch (1/96 inch possible by ESC sequence)
Platen size: 13 inches (printing line 11 inches)
Ribbon: IBM82 compatible multistrike or single strike ribbon (Selectric II Ribbon)
Interface: Centronics Parallel (Standard) RS-232C Serial Interface available as an option
Dimensions: 520 mm (W) x 454 mm (D) x 151 mm (H) 20.5" (W) x 17.9" (D) x 5.9" (H)
Weight: 14 Kgs. (31 lbs)
MTBF: 2,500 hours at 25% duty
MTTR: 15 minutes
Noise: Less than 62 db A (1 metre from the equipment)
Buffer memory size: 2K bytes standard and expandable up to 8K bytes (Option)
Option: Tractor (bi-directional, uni-directional), cut sheet feeder

*IBM SELECTRIC II is a trade mark of IBM

WE SELL SOFTWARE TOO

CP/M-80 SOFTWARE

BDS C Compiler	$ 299.00
Cbasic-II	$ 295.00
CB-80 (Cbasic compiler)	$ 799.00
CIS-Cobol	$1135.00
CP/M Plus (CP/M 3)	$ 579.00
CP/NET	$ 339.00
Cardbox	$ 375.00
dBase-II	$ 952.00
Dataslar	$ 333.00
Directory Sort	$ 65.00
Display Manager	$ 619.00
Diszilog	$ 249.00
Mailmerge (WS)	$ 333.00
M/PM-II	$ 559.00
Pascal MT«	$ 649.00
SPP (for Pascal MT«)	$ 406.00
Pascal MT« & SPP	$ 999.00
Punctuation and Style	$ 213.00
Sid	$ 22.04
Spellbinder (CP/M-80)	$ 579.46
Spell Development Pkg	$ 133.04
Spell C.Itoh interface	$ 44.64
SuperCalc	$ 347.32
Supersort-I	$ 292.98
Supersort-II	$ 250.88
Spellstar (WS)	$ 333.00
The Word Plus	$ 199.00
Wordstar	$ 669.00
Vedit	$ 195.00
V-Com	$ 119.00
V-Spool	$ 79.00
Zsid	$ 139.00

CP/M-86; MS-DOS SOFTWARE

Cbasic-86	$ 509.95
CIS-COBOL-86	$1195.00
CP/M-86 (uninstalled)	$ 459.00
CP/M-86 for IBM PC	$ 99.00
Concurrent CP/M-86	$ 549.00
dBASE-II-86	$ 952.00
GSX-Kernel	$ 769.00
GSX-Plot	$ 769.00
GSX-4010	$ 769.00
Pascal MT« 86	$ 909.00
SPP-86	$ 425.00
Pascal MT« 86 SPP	$1195.00
Spellbinder (CP/M-86)	$ 695.00
Spellbinder (MS-DOS)	$ 695.00
Spell Development Pkg	$ 149.00
Sid-86	$ 275.00
The Word Plus-86	$ 249.00
Vedit-86	$ 195.00

The following are registered trademarks:
CP/M-80 — Digital Research Inc. CP/M-86 — Digital Research Inc. MS-DOS — Microsoft. PC-DOS — International Business Machines. Perfect Writer — Perfect Software. Perfect Calc — Perfect Software. MBasic — Microsoft. GWBasic — Microsoft. IBM — International Business Machines.

C-TECH pty. ltd. 48 A'Beckett Street, Melbourne, Vic., 3000 . . . .ph. 347 7917

Computer Division of Ritronics Wholesale

packages 1-2-3 could not be sold with the operating system already installed, since this would be an infringement of copyright.

Once this initial chore is complete, taking all of three minutes to perform, the whole world of 1-2-3 awaits. A particularly noteworthy feature of the software is the cryptically named Lotus Access System. To run it, simply type "LOTUS" and all the data disk formatting, copying, and other startup or occasional activities can be performed by menu selection at the touch of a button. There is absolutely no need to wrestle with the intricacies of PCDOS, since everything you need is handled by the Access System. Finally, having formatted a data disk, and made copies of the two copiable disks, you are ready to start. Of course the Access System has facilities for running the various 1-2-3 programs, and you simply select 'run 1-2-3' on the Access Menu to get started right away.

Spreadsheeting

As we have already noted, 1-2-3 is primarily a spreadsheet system, so I was particularly concerned with evaluating this usage of it. The initial display looks comfortingly like a spreadsheet, consisting primarily of the highlighted row and column headings, with a great empty space in the centre of the screen, just waiting to receive the spreadsheet data. One cell in the spreadsheet has special significance. It is displayed highlighted. This is the current cell where all data entry and modifications take place. The location of the current cell can easily be changed using the four arrow keys on the PC keyboard. These cause its location to shift in the appropriate direction, and attempts to move off the edge of the screen cause the whole focus of display to shift accordingly — all fairly standard spreadsheeting.

Moving around the spreadsheet in this fashion would eventually establish how big it is, but in fact it is so big — 2048 rows by 256 columns — that it is quicker to look up the vital information. Of course, as with most spreadsheet systems, it is not possible to enter data in each and every cell — all the RAM memory gets consumed long before that, even with a PC at full RAM capacity.

Following the usual convention introduced, by VisiCalc, the rows are identified by numbers, and the columns by letters (A, . . .Z, . . .AA . . . IV). Thus the top left-hand corner has coordinates A1 and the bottom right-hand corner is IV2048. Naturally it is possible to jump huge distances at one go. Simply push the relevant PC function key (there are ten function keys on the PC and the plastic template supplied by Lotus identifies the function each performs) then enter the coordinates.

There are a few other keystrokes for moving around the spreadsheet: paging up, down, left and right, home, end of line and, in short, everything you could reasonably hope for in this respect.

Entering text, formulae or numbers is achieved by 'moving' to the cell to be affected and then typing whatever is required there. The whole spreadsheet is instantly recalculated after each entry. There is not generally any need to inform 1-2-3 what type of entry is being made, it can sort that out itself. However, if we want to start text with a number (eg, '26th Jan'), then we simply prefix the entry with the quote keystroke. For most text entry this would not be necessary.

Formulae are built up in the usual spreadsheet fashion, eg, "A1 + A2 * A3", "99*@COS(DF99) — @PI", etc. The '@' symbol has no special significance, but is used to precede all the special built-in functions. In fact there is a huge range of these functions including: trigonometry, logic ('if's, 'true's and 'false's), financial (eg, net present value), statistics (such as standard deviation) and date facilities. The date functions are particularly interesting since they can access the PC's internal clock and also be used for precise data calculations (eg, number of days elapsed between 5th Feb and 29th July).

Most spreadsheet 'models' have an underlying pattern where, for example, all

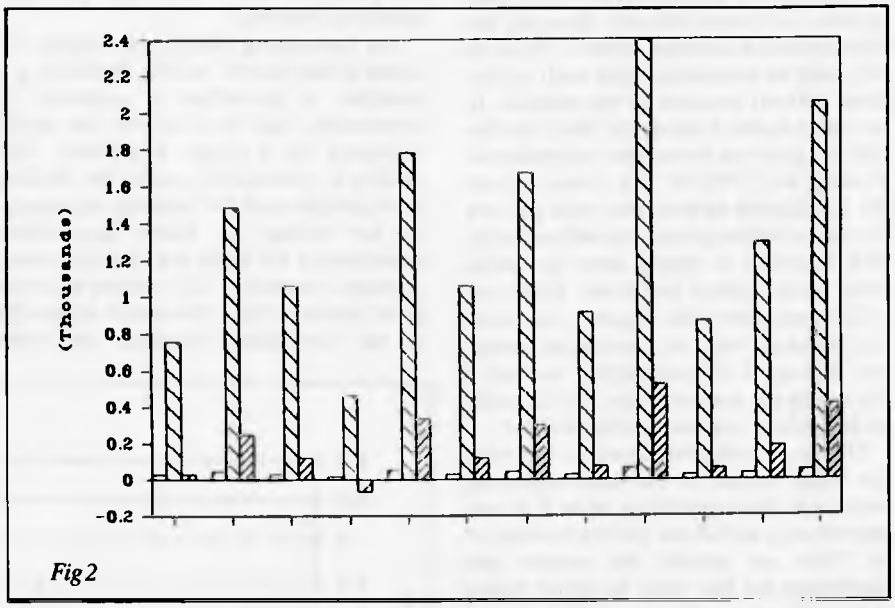


Fig 2

	jan	feb	mar	apr	may	june
num sold	23	45	32	14	54	32
price	$33.00	$33.00	$33.00	$33.00	$33.00	$33.00
val sales	$759.00	$1,485.00	$1,056.00	$462.00	$1,782.00	$1,056.00
cost70%	$531.30	$1,039.50	$739.20	$323.40	$1,247.40	$739.20
overhd	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00
profit	$27.70	$245.50	$116.80	($61.40)	$334.60	$116.80

july	aug	sept	oct	nov	dec	tot
44	24	63	23	34	54	$442.00
$38.00	$38.00	$38.00	$38.00	$38.00	$38.00	
$1,672.00	$912.00	$2,394.00	$874.00	$1,292.00	$2,052.00	$15,796.00
$1,170.40	$638.40	$1,675.80	$611.80	$904.40	$1,436.40	$11,057.20
$200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$2,400.00
$301.60	$73.60	$518.20	$62.20	$187.60	$415.60	$2,338.80

Fig 1

the calculations in one column have the same logic as the adjacent one. Thus most spreadsheet systems have a 'replication' facility so that only one column need be set up and then copied into the required number of adjacent columns. 1-2-3 is no exception, and provides excellent replication facilities, circumventing a lot of laborious retyping!

Using 1-2-3's replication introduces us to the 'commands'. Since the way the command menus work is the same for all operations, I shall first look at the way they work in general. Simply pressing the slash key ('/') reveals a command menu on a single line at the top of the screen. This menu has nine options, each starting with its own unique letter. The options include 'Copy', 'Quit', 'Print', and so on. One of them is highlighted, and a brief elaboration of what it does is displayed below. If we push the PC "ENTER" key this option is selected (and may lead to a sub-menu working along the same principles as the main one, and so on). Alternatively the left and right arrow keys may be used to flick the highlighting on to the next or previous options, of course instantly changing the elaboration information below — thus it is very easy to determine what each option does, without recourse to the manual. In fact there is also a powerful 'Help' facility that will give you even more information. Pushing the 'ENTER' key always selects the highlighted option, but once you are familiar with the options you will probably find it quicker to simply press the initial letter of the option you want. Moreover 1-2-3 remembers what options you chose on a previous 'visit' to a particular 'menu' and highlights it accordingly. As this is frequently the one you want, 1-2-3 is really making life as easy as possible for you!

Doing a replication involves selecting the 'Copy' option on the main command menu and then specifying what it is you want to copy and where you want to copy it to. You can specify the source and destination for the 'copy' by either typing in the relevant coordinates or by 'pointing' to the cells you want by simply using the arrow keys. Any cell reference in a formula is copied in a relative fashion, unless it was originally entered as an 'absolute' reference. Absolute cell references include the '$' symbol — for example a formula reference to cell B5 would be modified according to where it is copied, but "B5" would remain unchanged wherever it was copied. It is possible for cell references to be absolute in one dimension (row or column) but not the other. Thus 1-2-3 can also cope with $B5 or B$5 references.

The facilities described so far were sufficient to run the spreadsheet Benchmark tests, and in fact 1-2-3 performed them all very well. Now that 16-bit micros are coming of age and RAM is becoming increasingly cheap, we should be looking for spreadsheet software that works creditably in a million bytes of RAM or so. Software that is even a little bit on the slow side will just grind to a halt when faced with a megabyte of data to recalculate. 1-2-3's time of 54 seconds to recalculate 370 rows of the Benchmark, on a 320k PC, makes it the fastest number cruncher reviewed so far, and it would almost certainly be feasible to use it, without excessive delays, on a fully RAM'd PC (although I was unable to test this).

An interesting facility introduced by Lotus is the 'macro' facility. Basically it is possible to predefine a sequence of keystrokes, and then invoke the entire sequence by a single keystroke. This facility is particularly useful for dealing with complicated file loading sequences, or for setting up tricky spreadsheet manoeuvres for lesser trained personnel, perhaps. Actually 1-2-3 macros are even more powerful than this since it is possible to use 'conditional branches' and other devices — in short to develop 'programs' in the 'language of 1-2-3', furtively turning the advanced user into a programmer!

In addition to the facilities already covered 1-2-3 has a full complement of the usual bells and whistles; everything you would associate wih top quality spreadsheets such as Microsoft's Multiplan or VisiCorps's VisiCalc. Column widths can be varied, cells protected, screen split in two, models split, merged and printed, and also a variety of different data file formats are supported including VisiCalc and DBase II.

Any features missing? Well, I was unable to find a facility to display the amount of workspace unused, certainly this information was not incorporated in the normal status display. A minor irritation was that I was unable to stop 1-2-3 printing in mid-print. Obviously this can be annoying if you have just set it off on a long printout only to realise you have done something wrong, but also graphics printing (see below) is necessarily slow, even for small amounts of data, and I could discover no way to interrupt that either. Only one other fly in the ointment: clearing the workspace did not always seem to recover all available memory. I circumvented this problem by quitting then re-running, a particularly easy exercise since on quitting 1-2-3 you fall into the Access System, not the operating system — and re-running is therefore a single keystroke.

Graphics

1-2-3's graphics facilities are excellent. The user interface for designing the graphs is

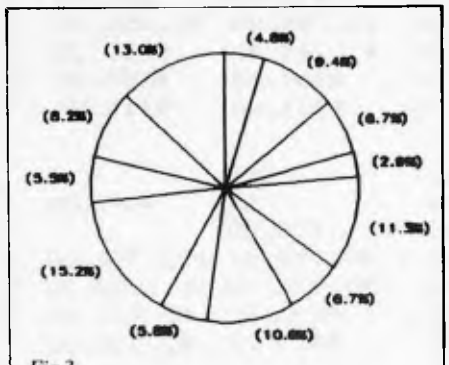


Fig 3

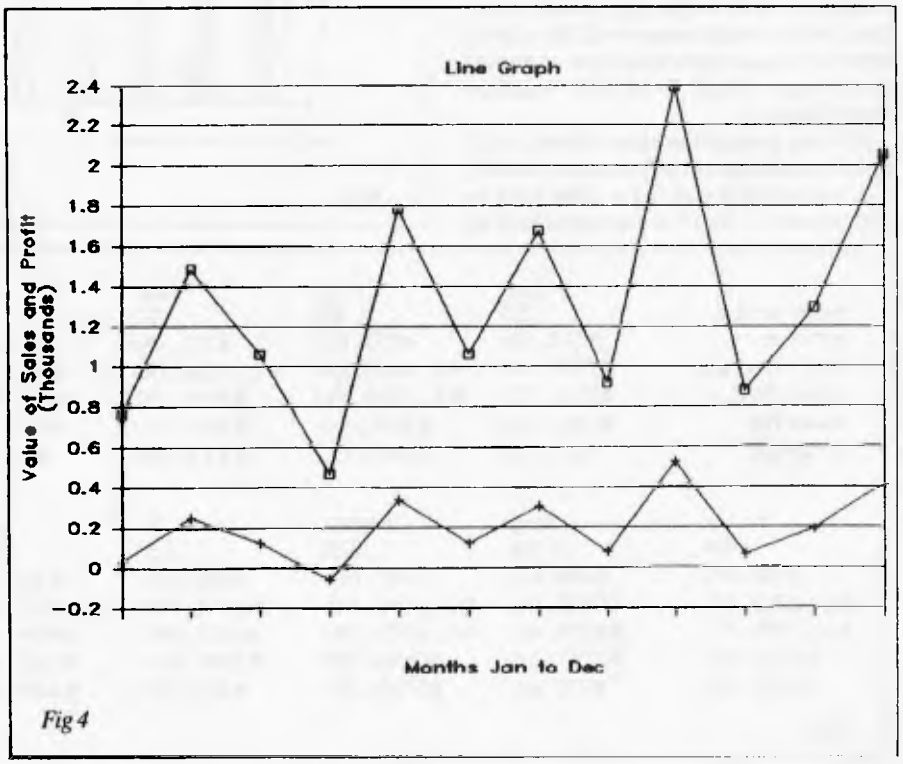
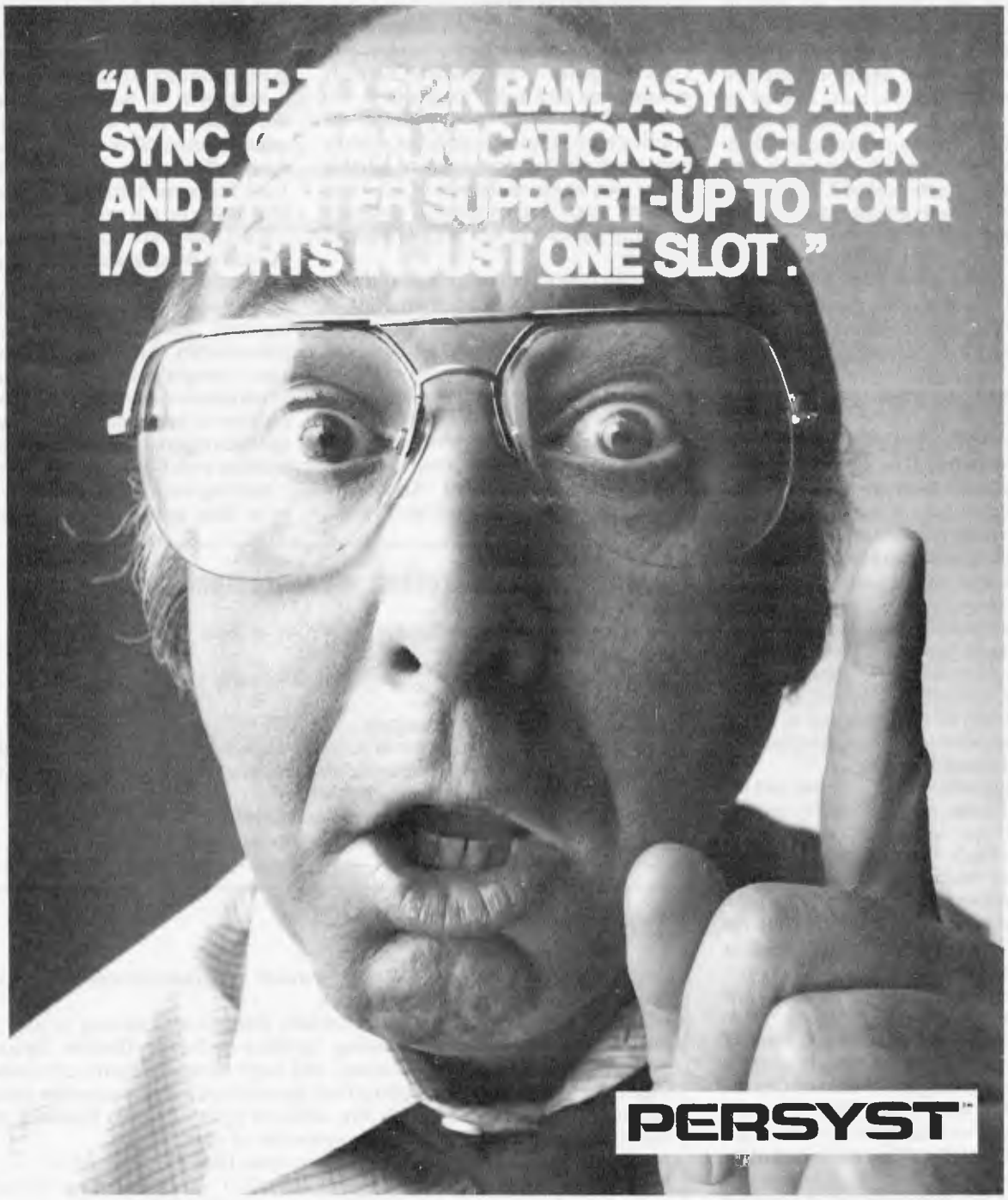


Fig 4

IMAGINEERING™
"The Art of Software"
presents

THE TIME SPECTRUM™



Available for the IBM PC & XT at all fine microcomputer outlets
IMAGINEERING, 579 HARRIS STREET, ULTIMO, N.S.W. 2007. TELEPHONE: (02) 212 1411

superb. And the printout produced by the IBM Epson is crisp and clear. A pat on the back all round — the graphics were a real treat to use!

Having got that over with (no, I'm not related to anyone at Lotus), how does this facility work?

Well, to check out the graphics facilities I set up a simple model (Fig 1), a classic 12 month financial calculation with totals, and so on. As you can see the numbers sit lifelessly on the page, just waiting to be graphed!

1-2-3 provides options for plotting five different types of graphs: line graphs, bar graphs and pie diagrams, as well as mathematical and stacked bar graphs. Stacked bar graphs are like ordinary bar graphs, only each bar might be composed out of several smaller bars, shaded or coloured differently. Each sub-bar might be sales figures for a particular product, and the whole bar would be total sales. The mathematical graphs (called XY graphs by 1-2-3) are like line graphs only they are created from pairs of X-Y coordinates and not just from a list of Y-values. Most financial graphs are defined for fixed and regular X values (eg, the 12 months of the year) and the X information is not needed for plotting them, but more mathematical graphing generally requires that both coordinates be supplied.

Before a graph can be viewed it is necessary to go through a certain minimal set-up procedure. First of all 'Graphics' must be selected from the main command menu, then the type of graph specified, by using the relevant option of the sub-menu. Up to six sets of data can be plotted simultaneously on the same axes, and of course a range of values are needed for each. The sets of data are denoted A to F, and once again by a simple process of menu selection: first 'A' can be chosen and its range of values pointed to, using the arrow keys, and then 'B' is chosen, and so on. Of course if any of A to F are unspecified then they are ignored in the plot.

Having specified a pie diagram, and the 12 profit figures of Fig 1, I simply pressed 'V' for 'View' and was treated to the display in Fig 3. Printing this graph was a little more tricky since the 1-2-3 graph printing software is on another disk, and it is necessary to save this graph image before quitting 1-2-3 and changing program disks — more on this later.

To view other types of plot, simply change the plot-type required and 'View' again. All other values set up are still remembered. Making things a little more tricky, I set the ranges on A, B and C to the 'num sold', 'val sales' and 'profit' rows and was instantly viewing the bar graph in Fig 2. 1-2-3 performs the scaling and layout of the graph quite automatically, although it is possible to override its defaults if you want to. Notice that the negative value for April's profit is coped with without incident.

As an example of a line graph, refer to Fig 4. In this instance the upper line plots the value of sales, and the lower line plots profit, but various titles have been added. It would also have been possible to add the month names along the X-axis, redefine the symbols along each line, and all sorts of other things besides, but it is impossible to show the whole scope of this software in one short article. Of course this figure was actually reproduced from a printout, not a photograph of the screen, And it actually also illustrates a few features provided by the graph print program.

To print graphs it is first necessary to save their image in a data file, then quit 1-2-3 altogether. This is about the only grouse I can find in 1-2-3's graphics — it would obviously be preferable if the printing were fully integrated, but actually once you have the print program, running it is as easy to use as the rest of 1-2-3 and uses the same menu structure. Ordinary non-graph printouts are fully integrated anyway.

Among other options, it is possible to choose two different fonts from a list of eight for all captioning and marking of axes. The two fonts in Fig 4 are 'Italic2' and 'Roman1'. It is also possible to take advantage of a colour printer if you have one, using different colours for different lines, bars or whatever. Selecting option 'Go' sets the printer going (unstoppably, as I have already mentioned). Although a typical plot occupies only half an A4 page, it does take a couple of minutes to produce. This is because the amount of information needed for printing graphs is considerably greater than that needed for text, and this takes longer for the computer to process and transmit. The end result is well worth waiting for!

Information management

It is very easy to use 1-2-3 for information management, but the amount of information that it can handle is limited by the amount of RAM in the machine; not, as is usually the case with information managers, by the disk capacity. Nonetheless half a megabyte of RAM is no longer an impossible dream, and would have been quite a respectable size of disk only a couple of years ago, so it is possible to use 1-2-3 for some 'database' operations, as long as you do not expect too much of it.

Each record in a 1-2-3 database occupies one row in the spreadsheet and each field in the record being in a different column. Adding new records is achieved by inserting rows, using the normal spreadsheet insert-facility. Adding new fields is just as easy — simply insert a column. In fact not all information managers would permit the addition of new fields once a few records had been entered, but there is no particular problem with 1-2-3 in this respect.

Interrogating the database is achieved by a 'data query' command, which can

Benchmarks and other measurements

These tests were run on an IBM PC with 320k of RAM.

Spreadsheet size: 256 columns wide by 2048 rows.
Numeric precision: 15 digits.
Max column width: 72 characters.
Benchmark 1(a): Maximum rows accommodated: 370; (b) and (c) Recalculation time: 54 secs, i.e. 7 rows per second; (d) Vertical scrolling: 6 rows per second; (e) Horizontal scrolling: 4 columns per second.
Benchmark 2: Max rows of text accommodated: 1210.
Benchmark 3: Max rows of numbers accommodated: 1380.

Checklist

Documentation: Substantial 350 page manual. Well indexed and clearly written. Quick reference booklet. Help screens.
User friendliness: Excellent. Very carefully thought out and easy to use.
Facilities: Extensive spreadsheeting facilities including flexible formatting, 'macros', spreadsheet manipulations, and large library of maths, statistics and logic functions. Extensive graphing from spreadsheet direct to screen or printer in colour or black and white with five different types of graph. Powerful (RAM based) database facilities for lower quantities of data.
Available on: IBM PC and possibly also some IBM PC 'workalikes'.
Price: Approx. $895. (Sourceware — (02) 411 5711 — are importing the product direct from Lotus. Lotus is available from most IBM PC dealers.)

CBS Coleco Vision CHRISTMAS SPECIAL

$249.00

Computer Edge has "slashed" the price of Coleco Vision just in time for Christmas. It's a terrific gift, not only for the kids but for the whole family. You'll receive hours of fun with this video game system of the future.

Features

- ★ Life-like colour and sound effects.
- ★ Recreates all the action and excitement of the real game with incredible precision.
- ★ Superior game play control with realistic arcade type control.
- ★ 8-directional joystick for full field movement, push button keyboard and two independent fire/action buttons for exciting interactive game play.
- ★ Expansion module that transforms the Coleco into the first video game system on the market that accepts cartridges from other manufacturers.
- ★ Expansion Module No. 2 transforms the system into the cockpit of a high performance race car and provides realistic sports action.
- ★ Full range of quality video game cartridges including arcade games, sports games, strategy games, play and learn games, action games, fantasy games, and casino games.

RANA DISK DRIVES

This superb family of floppy drives was designed and perfected by a team of industry respected engineers expressly for Apple computer owners, who have long been demanding more disk drives for their money.

ELITE ONE: the most economical Rana drive. It offers 15% more storage capacity than Apple disk drives. **$718.00** (inc. tax)

ELITE TWO: offers 4 times more storage than Apple disk drives. Has 32K bytes and 40 tracks on each side. Cost wise, it takes 2½ Apple disk drives to equal the performance of the Elite two and twice as many diskettes. **$958.00** (inc. tax)

ELITE THREE: is top of the range. Offers four times more storage, approaching hard disk performance. The disk space available is one of Rana's main features. Has fingertip writer/protect features. A pushbutton on the LED-lit panel gives you a new measure of fail safe control. While Elite drives are all plug compatible with Apple's controller, Rana's vastly superior controller card is a must for those growing data processing demands. With it you control four floppy drives using only one slot. **$1299.00** (inc. tax)

Uncanny head positioning accuracy, 300% faster track to track speed, better operating economy, gentler clamping action through an all new diskette centering cone, are just a few of the vast number of operating refinements of a RANA disk drive.

Computer Edge Pty. Ltd.

bankcard welcome here

DINERS CLUB

AMERICAN EXPRESS

364 Ferrars Street, Albert Park, Vic 3206. Telephone: (03) 690 1477
OR
229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622

For toll-free calls . . . orders only, ring **008 33 1131**
Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.

TEWRITER BYTEWRITER BYTEWRITER BYTEWR

MASSIVE SAVINGS ON THE BYTEWRITER DAISYWHEEL PRINTER

LETTER QUALITY PRINTER **AND** TYPEWRITER IN ONE PACKAGE

The bytewriter is a new Olivetti Praxis 35 electronic typewriter with a micro-processor controlled driver added internally.

Keyboard
Alphanumeric and function keys:
44 alphanumeric keys (100 printable characters) and 17 function keys.
REPEAT KEY (for repetitive use of any key).
Two shift keys.
Shift lock.
Automatic repeating space bar.
Automatic repeating return and vertical spacing.
Return without vertical spacing.
Tabulator setting key.
Tabulator clearing key
Alphabetic tabulation key.
Cancel key (automatic for the last ten characters typed).
Automatic repeating backspace key.
Right-hand margin setting key.
Left-hand margin setting key.
Margin release key
Forward half-space key.
Automatic relocate typing point key.
10, 12 or 15 characters/inch pitch selector.

FEATURES
- ★ Underlining
- ★ 10, 12 or 15 characters per inch switch selectable
- ★ 2nd keyboard with foreign grammar symbols switch selectable
- ★ Changeable type daisywheel
- ★ Centronics-compatible parallel input operates with TRS-80, Apple, Osborne, IBM and others
- ★ Cartridge ribbon
- ★ Typewriter operation with nothing to disconnect
- ★ Service from any Olivetti dealer
- ★ Self test program built in.

THE BYTEWRITER BYTES INTO YOUR WORKLOAD AND NOT INTO YOUR POCKET

Praxis is a trademark of Olivetti Corp.
TRS-80 is a trademark of Tandy Corp.
BYTEWRITER is a trademark of Williams Laboratories

JUST $799.00 (inc. s.t.)

RUSH YOUR ORDER TO US TODAY!

Computer Edge Pty Ltd.

bankcard welcome here

DINERS CLUB

AMERICAN EXPRESS

364 Ferrars Street, Albert Park, Vic 3206. Telephone: (03) 690 1477
OR
229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622

For toll-free calls — orders only, ring **008 33 1131**
Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.

INTERFACE CARDS

These peripheral cards are NOW redesigned and manufactured in Australia. Because of competition from overseas it is necessary for the pricings to be very keen.

COMPUTER EDGE has a number of cards for you to choose from. Stocks are limited, **SO HURRY TO COMPUTER EDGE FOR THESE BARGAINS!!**

1. Z80 Cards — allow you to run CPM software. **$156.00** (inc. tax)

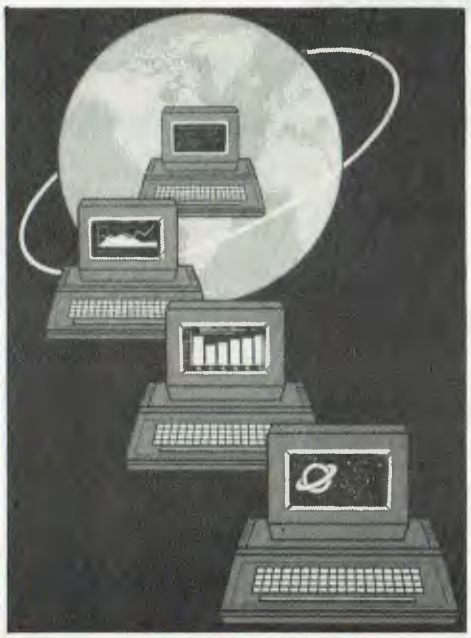
2. Parallel Cards — contain jumper blocks to enable the user to re-configure the interface board for operation with different types of printers. **$108.00** (inc. tax)

3. Sercom II — serial interface card. Enables Apple II to communicate with external devices, dumb or intelligent terminals, other computers or another Apple II or Apple III by using acoustic couplers, modems or through direct connection. Sercom II makes available power supply connections on its interface cable which enables it to be plugged directly into and operate a Sendata 700 series acoustic coupler. **$132.00** (inc. tax)

4. 16K RAM Card — increases the RAM of your machine by an extra 16K RAM and allows **Integer** Basic programs to be run with Applesoft in ROM or Applesoft to run with **Integer** in ROM. Compatible with CP/M 2.2 and 2.3. **$118.00** (inc. tax)

80 Column Card — allows user to have 80 characters on line, rather than 40 characters. Essential for word processing and CP/M application. **$138.00** (inc. tax)

THE PRONET NETWORKING SYSTEM



PRONET provides all the amenities of a "personal computer" with the speed and functionality of larger, more costly systems.

The PRONET links up to 128 of the most popular micro computers at distances over 5,000 feet with speeds at 4 million bits per second.

Select the multi-user operating system that suits you best, featuring **Password Security, Turnkey Command, File and Record Locking, spooling to common printers, electronic mail, educational languages and much more.**

The PRONET system emphasizes computing solutions at an affordable cost. Features found in systems costing far more are STANDARD components of the PRONET SYSTEM making networking a cost effective necessity; not an epensive luxury. The PRONET SYSTEM is a networking solution for the the serious computer user

PRONET AND ROS ARE AVAILABLE FROM:

Computer Edge Pty Ltd.

bankcard welcome here

DINERS CLUB

AMERICAN EXPRESS

364 Ferrars Street, Albert Park, Vic 3206. Telephone. (03) 690 1477
OR
229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622

For toll-free calls . orders only, ring **008 33 1131**
Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.

WOMBAT A B

NEW RELEASE

Australia's first fully designed and manufactured low-cost Apple-compatible microcomputer suitable for home and school.

DESIGNED AND MANUFACTURED BY COMPUTER EDGE

$325 ex tax

$375 with tax

SPECIFICATIONS

CPU: 6502 1 MHz
RAM: 16K expandable to 64K
ROM: 18K (12K Microsoft BASIC,
4K I.O., 2K character generator)
Screen Format: 40 x 24
Colour: NTSC colour adaptable to PAL
Keyboard: 56 keys ASCII (Rubber)
Upper and lower case
Cassette: 1200 baud
RF Modulator for TV or monitor
Graphics: 280 x 192, 40 x 48
Power supply: 9V 1A (Outside)

SPECIAL FEATURES

Built-in Printer Interface compatible with most printers.
Provision for Home Control and Sensing Functions.

SIZE

290mm x 220mm

SOFTWARE COMPATIBILITY

Compatible with most computers using 6502 CPU and CP/M Softwares FORTRAN, PASCAL, COBAL and BASIC Languages.

EXPECTED DELIVERY
FROM FEB. 1, 1984
ORDERS BEING ACCEPTED NOW!

Computer Edge Pty Ltd.

364 Ferrars Street, Albert Park, Vic 3206. Telephone: (03) 690 1477
OR
229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622

bankcard welcome here

DINERS CLUB

AMERICAN EXPRESS

For toll-free calls . . . orders only, ring **008 33 1131**
Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.

★ ★ WOMBAT ★ ★

Computer Edge is pleased to announce the release of seven WOMBAT models

The standard case WOMBAT range includes

WOMBAT 1
WOMBAT 2
WOMBAT 3

The detachable keyboard WOMBAT range includes

WOMBAT 1D
WOMBAT 2D
WOMBAT 3D
WOMBAT model PC-101

	WOMBAT 1, 2, & 3 WOMBAT DETACHABLE KEYBOARD	CODE	DESCRIPTION	OUR RETAIL EX. TAX	OUR RETAIL WITH TAX
STANDARD CASE	1. WOMBAT 1	(W1)	Basic unit with 48K RAM, numeral keyboard and upper-and-lower case.	$625.00	$ 695.00
	2. WOMBAT 2	(W2)	Same as Wombat 1 but with 64K RAM.	$690.00	$ 775.00
	3. WOMBAT 3	(W3)	Same as Wombat 1 but with 64K RAM and has a dual processor on the motherboard with both 6502 and Z-80 on board. Can OPERATE CP/M or Applesoft programs.	$765.00	$ 840.00
	4. WOMBAT 1D	(W1D)	Same as Wombat 1 but comes with detachable keyboard.	$745.00	$ 830.00
	5. WOMBAT 2D	(W2D)	Same as Wombat 2 but comes with detachable keyboard.	$795.00	$ 870.00
	6. WOMBAT 3D	(W3D)	Same as Wombat 3 but comes with detachable keyboard.	$890.00	$ 965.00
	7. PC-101	(WPC)	Has 64K RAM and comes with keytronics IBM-like keyboard. Runs Applesoft programs, has a sound microprocessor on board.	$950.00	$1045.00

Standard features on all models

- ★ Compatible with all APPLESOFT programs
- ★ Typewriter style ASCII keyboard with numeric keypad.
- ★ Upper and lower case
- ★ 8 expansion slots
- ★ Autostart monitor

Standard case WOMBAT shown

The new range of WOMBATS are just in time for Christmas.

RUSH YOUR ORDER TO:

Computer Edge Pty Ltd.

364 Ferrars Street, Albert Park, Vic 3206. Telephone: (03) 690 1477
OR
229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622

For toll-free calls — orders only, ring **008 33 1131**
Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.

bankcard welcome here
DINERS CLUB
AMERICAN EXPRESS

CED CARD READER

The Card Reader allows you to provide input to your computer by way of specially designed cards.

- ★ The Card reader is especially useful when a number of people will be using the same terminal. For example, in a BASIC programming classroom students can compose programs on cards, freeing the computer for other uses.
- ★ All you do is mark the cards with the appropriate data and insert them into the card reader.
- ★ The Card reader was designed with versatility and universal software compatibility in mind.
- ★ Card readers come with a manual interface card and diskette containing multi-choice marking program.
- ★ Supply of cards is included with each Card reader package.

SPECIAL PRICE JUST **$399** ex tax

SNAPSHOT

JUST $234.00 (with tax)

Snapshot is a peripheral card that is **NOW MANUFACTURED IN AUSTRALIA** under licence

- * Card is for Apple II or compatible range of machines
- * Makes back-up copies of copy protected programs
- * Copies programs that baffle other copiers, like Locksmith and Copy II plus, in just 30 seconds
- * Analyzes and debugs programs

SNAPSHOT will probably be one of the most useful cards you will ever put into your micro

SNAPSHOT PRICES ARE NOW BEING SHOT TO PIECES AT COMPUTER EDGE SO COME ON IN AND SNAP UP A DEAL

ALL YOUR COMPUTER NEEDS ARE AVAILABLE FROM:

Computer Edge Pty. Ltd.

bankcard welcome here

DINERS CLUB

364 Ferrars Street, Albert Park, Vic 3206. Telephone: (03) 690 1477
OR
229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622

For toll-free calls , orders only, ring **008 33 1131**
Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.

THE ROS NETWORKING SYSTEM

Students using the ROS Network at school

FEATURES

- ★ Networking system for the Apple II micro or compatible.
- ★ Replaces floppy disk drives on up to 127 independently run computers.
- ★ Can be expanded for significantly less than the cost of an additional drive.
- ★ TERRAPIN LOGO is available in a multi-user version.
- ★ HARD DISK interfacing also available.
- ★ ROS comes with print spooling software.

$395 for central card and software (ex tax)
$270 for each card thereafter (ex tax)

Computer Edge Pty Ltd.

bankcard welcome here.

DINERS CLUB

AMERICAN EXPRESS

364 Ferrars Street, Albert Park, Vic 3206. Telephone: (03) 690 1477
OR
229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622

For toll-free calls — orders only, ring **008 33 1131**
Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.

KOMTEK — KOMTEK — KOMTEK

KOMTEK — KOMTEK — KOMTEK — KOMTEK

This TRS-80 compatible unit can be inexpensively upgraded to include all facilities normally found in more expensive computers. The compatibility with TANDY BASIC LEVEL II means that thousands of programs are available for the KOMTEK micro.

FEATURES

- ★ 16K RAM with real typewriter keyboard.
- ★ Expandable to 48K
- ★ Home control functions
- ★ Programmable timer
- ★ Built in VHF RF modulator
- ★ Low resolution graphics
- ★ Built in speaker
- ★ Auto colour: For turning your black and white games and graphics into colour automatically.

MONITOR NOT INCLUDED

ALL THIS IN ONE COMPACT, BUT VERY POWERFUL UNIT FOR THE SENSATIONAL PRICE OF JUST $439.00

PHONE US WITH YOUR BANKCARD ORDER RIGHT NOW!!

Computer Edge Pty. Ltd.

364 Ferrars Street, Albert Park, Vic 3206. Telephone: (03) 690 1477
OR
229 Chapel Street, Prahran, Vic 3181. Telephone: (03) 529 7622

For toll-free calls ... orders only ring **008 33 1131**
Toll-free calls on 008 — numbers allow you to telephone from anywhere in Australia for cost of a local call.

bankcard welcome here

DINERS CLUB

AMERICAN EXPRESS

LOTUS 1-2-3

cope with quite complex search criteria. The criteria themselves are simply set up somewhere in the spreadsheet. It is also possible to sort the records, on any one or two fields, for example, on name or name within department.

All the normal spreadsheet operations, row and column summing, and so on, are still available, and in addition 1-2-3 has some built-in functions, such as standard deviation of selected fields which are customed specifically for database usage.

Once you have some basic understanding of the way 1-2-3 works as a spreadsheet, it is particularly easy to start using it for setting up a database. All the spreadsheet skills still apply and it is simply a matter of learning how to work the query and sort commands, along with the special database functions if you need them. Certainly the simpler information management tasks can be handled quite adequately by 1-2-3, and it may even be useful as a test-bed for more complex tasks. Since the spreadsheet is always held totally in RAM, no matter what it is being used for, 1-2-3's database capacity is limited by the amount of RAM in the PC. It would also be difficult to cope with more than 2048 records since that is the maximum number of rows permitted in the spreadsheet.

Plus

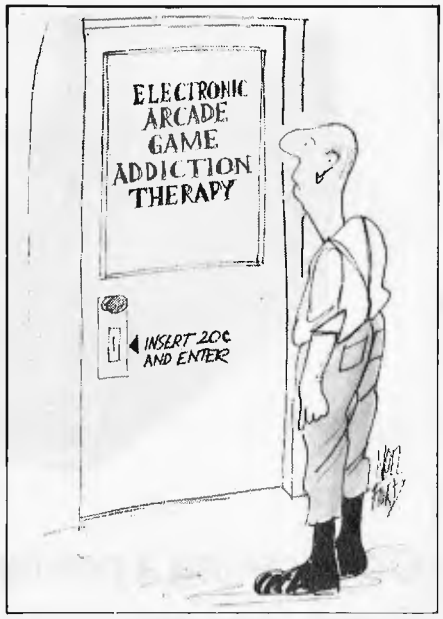
The front of the manual lists 1-2-3's capabilities as: Spreadsheet (corresponding to 1), Graphics (2), Information Management (3) and finally Plus. Let's assume Plus is a synonym for text processing, the weakest of the four facilities offered by 1-2-3. If Plus actually stands for something else, then it would be an even weaker facility than the text processing.

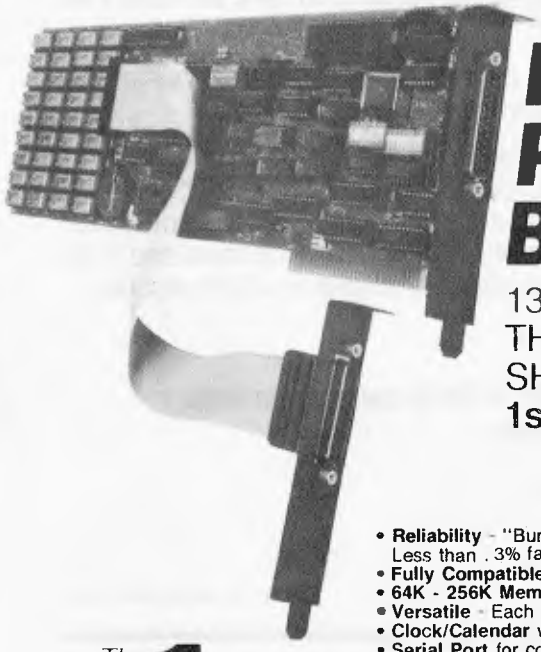
If a long string of text is entered into a cell, 1-2-3 does not necessarily cut it short when displaying it. If the cell to the right is empty then it 'borrows' its space and writes on top of it, and so on to the next cell if necessary. This feature, useful for normal spreadsheeting anyway, allows the creation of lines of text. Editing can be achieved by using the normal cell-edit facility, and of course line insertions and deletions are also possible using the normal 1-2-3 row insert or delete.

Conclusions

For spreadsheeting, 1-2-3 can be numbered with the best. For graphics, it is superb. Add in the fact that it can also do smaller scale information management tasks and rudimentary text processing, and all these capabilities are totally integrated. Thus it amounts to a very powerful all round package. And if that is not enough then the extra-discerning reader may care to wait until early 1984 when enhanced wordprocessing, enhanced database and communications software are scheduled to become available. Will they then call it 1-2-3-4-5?

END





RETAIL PRICE BREAK!

13 REASONS WHY THE 1st MATE™ SHOULD BE YOUR **1st CHOICE:**

The Best . . . Take Advantage of the New, Low Prices for 1st MATE, Tecmar's Most Popular Multifunction PC Expansion Board!

$560 64K

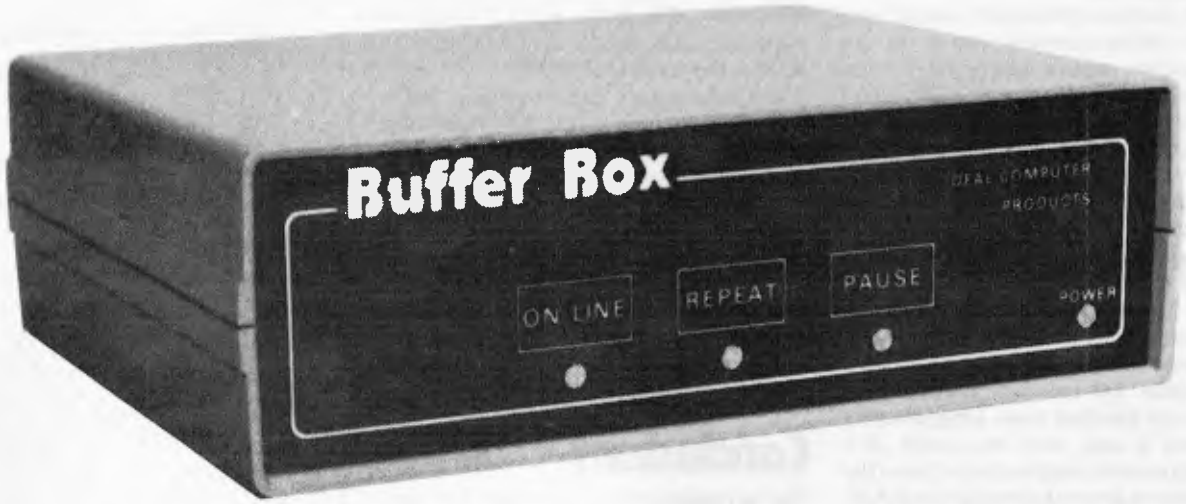
The 1st MATE

- **Reliability** - "Burned In" for 3 full days prior to shipment — Less than .3% failure rate
- **Fully Compatible** with IBM PC's and other Tecmar products
- **64K - 256K Memory** - fully socketed for easy field upgrade
- **Versatile** - Each 64K fully addressable
- **Clock/Calendar** with easily replaceable battery back-up
- **Serial Port** for communications
- **Parallel Port** for printer
- 60% **Faster** - SpeedDisk simulates ultra high-speed disk
- **RAMSpooler** - allows printing to become back-ground task — Easy to use - **Choice of 8 memory sizes**
- Accepts exclusive **PAL Option** to restrict certain information on 'need to know basis'
- Full One Year Warranty
- 72 Hour repair turn-around **Guaranteed** - 24 hour average

Don't settle for 2nd best! Get yourself the 1st MATE™, known for quality, quality, reliability and engineering excellence. So, take advantage of this fantastic price. Call Merton Scott (09) 328 6522 for information and to place your orders. We'll rush your shipment to you! Act Now!

Merton Scott
Business Machines PTY LTD
248 Newcastle Street,
Perth W.A. 6000
Telephone (09) 328 6522
Telex AA93413

Turbocharge your computer with the hottest computer accessory in town!



Considering a printer buffer?

Consider these standard **Buffer Box** features:

★ All models have 64K memory;

★ Reprint, Pause and Buffer/Printer Test functions;

★ Independently selectable baud rates;

★ Compact size — 20.5 cm × 15.4 cm × 6.2 cm;

★ Internal power supply;

★ 12 months warranty;

★ Designed and manufactured in Australia to suit Australian wallets.

Available in serial, parallel and serial-parallel combination.

Not considering a **Buffer Box?** Consider this:

Your printer constantly interrupts your computer to obtain more data to print and every time the computer is interrupted it must waste valuable processing while it services the interruption.

For you, the printing of many typical business reports becomes a frustrating chore.

The **Buffer Box** however, allows your computer to dump up to 25 pages of data in a little under 10 seconds — freeing the computer from its task of handling interruptions and thus allowing the operator to get on with valuable data entry.

★ The BUFFER BOX can pay for itself in under a month!

Work it out.

IDEAL

Dealer enquiries welcome.

COMPUTER PRODUCTS PTY LTD

(INC. IN NSW)

Suite 203, 109 Alexander Street, Crows Nest, NSW 2065
PO Box 803, Crows Nest 2065. Tel. (02) 439 7599. Telex AA29125

PRINT BIG

EPSON MX RANGE ENHANCED

Personalise your stationery and reach new heights with your character sets using Phillip Harvey's machine code printer driver for Z80-based micros.

ACTCOD	706B	BCNT	746A	BUFFER	739D	CHPT04	728F	CHPT06	7291
CHPT10	72B2	CHPT12	72B6	CHPT14	72C9	CHPT16	72CE	CHPT18	72D1
CHPT19	72DB	CHPT20	72E0	CHPT24	72E5	CHPT30	72EA	CHPT35	72FC
CHPT40	72FE	CHRCNT	746D	CHRPRT	7287	CNT	7473	CPOSAD	7470
CR	000D	CRADLF	70F9	CRF25	7110	CRF29	7178	CRF30	7125
CRF32	7136	CRF33	7148	CRF34	7168	CRF35	7182	CRF36	718F
CRF37	7192	CRF40	71A5	CRF45	71B6	CRF47	71BC	CRF50	71BD
CRF89	71B1	DBWTOF	70EC	DBWTON	70E5	DWD	0014	ESC	001B
FILE01	70AC	FILEND	70AB	FLAG	7475	GETCHR	736B	GM04	70C2
GM05	70C3	GM08	70C6	GM09	70C7	GM10	70CA	GM20	70D7
GM21	70D8	GM22	70DB	GRP	0002	GRPMDT	71F2	GRPMOD	70B9
GTC00	7379	GTC01	737F	GTC02	7380	GTC03	738B	GTC05	738F
LARTAB	7200	LEF	000A	LEF02	71D7	LEFFED	71C2	LFLTH	7474
LINPOS	7465	M1D2D1	7354	M1D2D2	735A	M1D2D3	7360	M1D2D4	7366
M1D2DT	734D	M1D4D2	733F	M1D4D4	7345	M1D4D5	7348	M1D4DT	7338
MEDTAB	7218	MODE	7467	MPRINT	7019	MPT01	7034	MPT10	7045
MPT12	7046	MPT20	7051	MPT40	7063	NC1T00	725E	NCHR1T	7258
NCHR2T	726F	NCHR4T	727F	OUTCHR	70DD	PC1T00	722C	PC1T01	7233
PC1T08	724C	PC1T10	7252	PCHR1T	7226	PCHR2T	7267	PCHR4T	7277
PRINT	739A	SIWD	0008	S2WD	0008	SCHR04	71E0	SCHR05	71E9
SCHR06	71EB	SCHRST	71DA	SET01	7005	SET02	700C	SET04	7016
SETN1	8000	SETN2	9000	SETPRT	730B	SETUP	7003	SMLTAB	7224
STP05	7319	STP10	731C	STP15	732B	STR03	7468	STR04	746B
STR05	746E	STR06	746C	WIDTH	7472				

Control-code call table 'ACTCOD'

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghi
jklmnopqrstuvwxyz*+£.,;:@!"$%&'()=_

ABCEDFGHIJKLMNOPQRSTUVWXYZabcdefghi
jklmnopqrstuvwxyz*+£.,;:@!"$%&'()=_

Fig 1 Difference between standard double width and characters spread in both directions

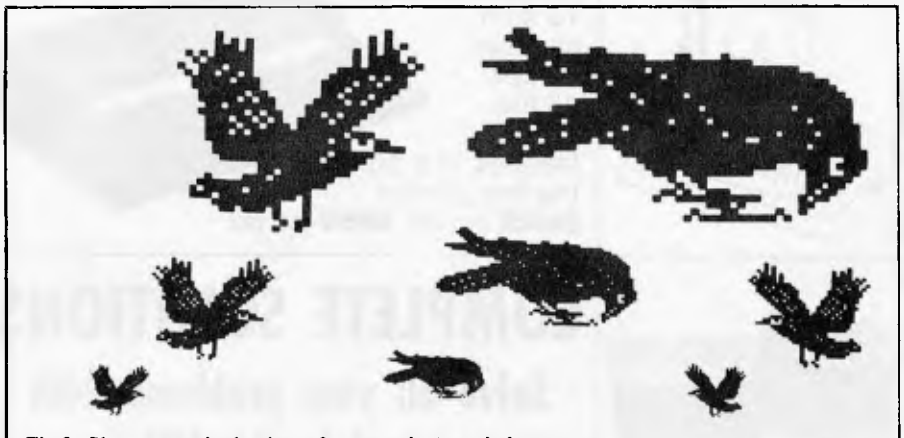


Fig 2 Shapes can be built up from re-designed characters

Fig 3 All characters will sit on the same base line

Have you made full use of your printer's graphics facility? With this article, you can add two extra user-definable character sets to your printer with a choice of three character sizes: normal, twice normal and four times normal size.

Most of the 'MX' range of printers give you the option of double width and condensed print. With both of these, the characters are only expanded, or condensed in the horizontal plane. Characters which can expand in both planes, horizontal as well as vertical, are clearly an advantage because of their more uniform structure (see Fig 1).

With the definable character facility you can produce all sorts of printed sheets very easily and cheaply. To give you an idea of what you can do, here are a few examples: headed notepaper, account sheets, character grids and screen maps, etc. To create different sheets you simply change your text file and/or part of the character tables. Of course, you don't have to just stick to single characters. You can make up pictures and shapes that span as many characters as you require (see Fig 2).

How it works

A line of text is first collected from the main program (such as editor), and stored in a two hundred byte-lons buffer. The next step is to process the line. This entails scanning the line to find the largest letters present (either 1*, 2* or 4*). This information is needed in order that all characters, independent of size, will sit on the same base line (see Fig 3). The actual printing is a very complicated process that would take up far too much space to explain in any depth, but here is a brief outline.

When using the printer's character set, all the characters are sent out as normal. But, with characters from the two extra character sets, the printer's user-definable graphics facility must be used. These extra characters are generated from tables created by the user. Enlarged characters are produced by spreading each 'character

BEGINNING OF SEASON SPECIALS

OSBORNE EXECUTIVE

CP/M plus Wordstar
Mailmerge,
Database (personal pearl),
UCSD P System
C Basic,
M Basic,
Supercalc,
7" built in Amber Monitor,
2 DD Drives,
Ports.

~~$3995~~ **$2495** incl tax

$2,500 software all included free

BROTHER HR15

Daisy Wheel Quality Printer

The affordable daisy wheel printer at the best value in town!!!!

$725 ex tax parallel, (2 boxes of discs free with very purchase!!!)

STAR GEMINI 10X PRINTER

120CPS,
bi-directional,
friction tractor graphics,
80, 96 or 132 characters per line,
9*9 character mode,
correspondence quality printing,
proportional spacing,
All the features you would expect in a top printer!

~~$720~~ inc tax **$560** inc tax

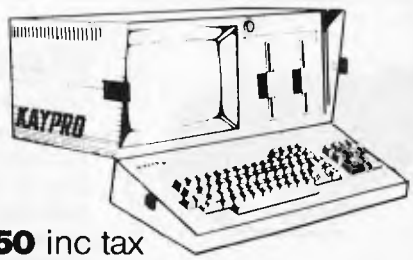
KAGA 12" HIGH RESOLUTION MONITOR

18Mhz band width,
Non-glare screen,
2,000 characters, 80*25 lines,
Green or Amber (you choose)

~~$320~~ inc tax **$245** inc tax

KAYPRO II

Portable business/ computer.
With all the software plus 80cps Epson compatible printer . . .



~~$3890~~ inc tax **$3450** inc tax

OLIVETTI PRAXIS-40

Olivetti daisy wheel typewriter/printer.
Praxis 40 with parallel interface.
13 inch carriage.
12 cps.
All the expected features in a top of the line printer!

~~$1025~~ inc tax, **$855** inc tax

VERBATIM DISKETTES

Single Sided Double Density . .

Usually ~~$59.00~~ Now **$39.00** !!!

Minimum purchase of 4 boxes.

COMPLETE SOLUTIONS

Solve all your problems with special prices!!!!

Phone now (02) 331 6799

All prices on existing stock only

dot' over two, or four dots, in both directions.

Connecting up

Before you can start printing, the program's workspace must be set up. To do this, call the routine 'SETUP'. This must be done before the printer is used. In 'SETUP' there is space in the source code for you to initalise your printer if required.

Where your editor used to call your own printer routine, it should now call this program (at its start address). The program is presently positioned at 7000H, but using your assembler, it can be sited anywhere.

Changing character mode

Each character set has its own initiation code. Insert the control code 'GRP' (see listing) followed by the appropriate number, into your text file. The 'GRP' code can be altered to any other code between 00H and 1FH which is not presently used (see the control-code call table 'ACTCOD').

0 — Standard printer character set.
1 — Set one, magnification one.
2 — Set two, magnification one.
3 — Set one, magnification two.
4 — Set two, magnification two.
5 — Set one, magnification four.
6 — Set two, magnification four.

The printer will remain in that mode until another mode is chosen.

Designing characters

Characters can be designed on grids, eight wide by sixteen long. These grids can be produced by your own printer when you start designing your own characters.

When you have drawn your new character on the grid, you now have to convert it into a series of sixteen hex bytes. Each row represents one byte made up of eight bits:

01111100 = 7CH
10000010 = 82H
10000000 = 80H
10000000 = 80H
01111100 = 7CH
00000010 = 02H
00000010 = 02H
10000010 = 82H
01111100 = 7CH
00000000 = 00H
11111111 = FFH
00000000 = 00H
00000000 = 00H
00000000 = 00H
00000000 = 00H
00000000 = 00H

With these sixteen bytes you can now enter them into the table.

Both tables begin with the code 20H, so to find the correct location, use the following equation:

ADDRESS = TABLE ADDRESS + (CHARACTER CODE – 20H)*10H

Example: CHARACTER CODE = 53H ("S")
TABLE ADDRESS = 8000H

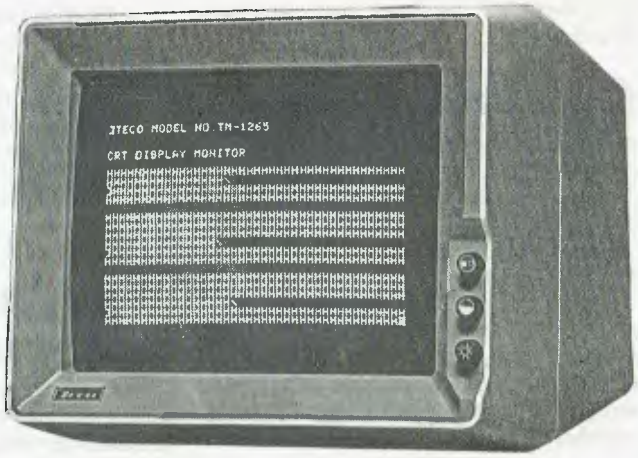
ADDRESS = 8000H + (53H–20H)*10H
= 8000H + 33H*10H
= 8000H + 330H
= 8330H

This gives you the address at which to enter your series of sixteen bytes.

END

```
0000
                        INCLUDE B:Z80.L


                ; Enhanced printer routine for MX-80/MX-70 with
                ; user-definable graphics.
                ;
8000            SFTN1   EQU 8000H       ; Set number one.
9000            SFTN2   EQU 9000H       ;  "    "     two.

                ; Control codes.
0002            GRP     EQU 02H         ; Graphic mode code.
000A            LEF     EQU 0AH         ; Line feed.
000D            CR      EQU 0DH         ; Carriage return.
0014            DWD     EQU 14H         ; Double width on.
001B            ESC     EQU 1BH         ; Escape code.

0008            S1WD    EQU 08          ; Character width for
                                        ; set number one.
0008            S2WD    EQU 08          ; Character width for
                                        ; set number two.

                        ORG 7000H       ; Program start address.
                        LOAD 7000H

7000 C31970             JP MPRINT       ; Input one character.
7003 F5         SETUP   PUSH AF         ; Setup workspace and
7004 E5                 PUSH HL         ; printer.
                ;
                ; ENTER CODE IN THIS SPACE
                ; TO SET UP YOUR PRINTER.
                ; HL & AF can be affected.
                ;
7005 AF         SET01   XOR A           ; Set up workspace.
7006 326B74             LD (STR04),A
7009 327574             LD (FLAG),A
700C 21DD73     SET02   LD HL,BUFFER    ; Empty buffer.
700F 227674             LD (LINPOS),HL  ;
7012 AF                 XOR A           ;
7013 326D74             LD (CHRCNT),A   ;
7016 E1         SET04   POP HL
7017 F1                 POP AF
7018 C9                 RET             ; Return to main program.

7019 F5         MPRINT  PUSH AF         ; SEND FILE TO PRINTER.
701A E5                 PUSH HL
701B 2A6574             LD HL,(LINPOS)  ; Position in buffer.
701E 77                 LD (HL),A       ; Enter new character
701F 23                 INC HL          ; in buffer.
7020 226574             LD (LINPOS),HL
7023 FE0D               CP CR           ; End of line?
7025 280D               JR Z MPT01      ; Yes, Jump.
7027 3A6D74             LD A,(CHRCNT)   ; No. of chars. in
702A 3C                 INC A           ; buffer.
702B 326D74             LD (CHRCNT),A
702E FEC8               CP 200          ; Buffer overflow?
7030 28DA               JR Z SET02      ; Yes, Jump.
7032 18E2               JR SET04        ; Return to program.
7034 D5         MPT01   PUSH DE         ; Now send line to
7035 C5                 PUSH BC         ; printer.
7036 DDE5               PUSH IX
7038 DD217574           LD IX,FLAG
703C CDA571             CALL CRF40      ; Check graphic mode.
703F CD2571             CALL CRF30      ; Scan line.
7042 CDC271             CALL LEFFED
7045 EB         MPT10   EX DE,HL
7046 226874     MPT12   LD (STR03),HL
7049 7E                 LD A,(HL)
704A FE20               CP 20H          ; Control code or char?
704C 3015               JR NC MPT40     ; Jump, character.
704E 116B70             LD DE,ACTCOD    ; Control code table.
7051 6F         MPT20   LD L,A          ; Index into table.
7052 2600               LD H,0          ;
7054 29                 ADD HL,HL       ;
7055 19                 ADD HL,DE       ;
7056 5E                 LD E,(HL)       ; Get routine address.
7057 23                 INC HL          ;
7058 56                 LD D,(HL)       ;
7059 EB                 EX DE,HL
705A 114570             LD DE,MPT10     ; Store return address.
705D D5                 PUSH DE         ;
705E ED5B6874           LD DE,(STR03)
7062 E9                 JP (HL)         ; Enter routine.
7063 3A6774     MPT40   LD A,(MODE)
7066 11F271             LD DE,GRPMDT    ; Graphic mode table.
7069 18E6               JR MPT20
                                        ; ACTION CODE TABLE
706B DD70       ACTCOD  DW OUTCHR       ; 00H - Not used.
706D DD70               DW OUTCHR       ; 01H -  "   "
706F B970               DW GRPMOD       ; 02H - (Graphic change)
7071 DD70               DW OUTCHR       ; 03H - Not used.
7073 DD70               DW OUTCHR       ; 04H -  "   "
7075 DD70               DW OUTCHR       ; 05H -  "   "
7077 DD70               DW OUTCHR       ; 06H -  "   "
7079 AB70               DW FILEND       ; 07H - (Stop printing)
707B DD70               DW OUTCHR       ; 08H - Not used.
707D DD70               DW OUTCHR       ; 09H - Not used.
707F DD70               DW OUTCHR       ; 0AH - (Line feed)
7081 DD70               DW OUTCHR       ; 0BH - Not used.
7083 DD70               DW OUTCHR       ; 0CH - (Form feed)
7085 F970               DW CRADLF       ; 0DH - (Return/LF)
7087 E570               DW DBWTON       ; 0EH - (Double width on)
7089 DD70               DW OUTCHR       ; 0FH - Not used.
708B EC70               DW DBWTOF       ; 10H - (Double width off)
708D DD70               DW OUTCHR       ; 11H - Not used.
708F DD70               DW OUTCHR       ; 12H -  "   "
7091 DD70               DW OUTCHR       ; 13H -  "   "
7093 DD70               DW OUTCHR       ; 14H -  "   "
7095 DD70               DW OUTCHR       ; 15H -  "   "
7097 DD70               DW OUTCHR       ; 16H -  "   "
7099 DD70               DW OUTCHR       ; 17H -  "   "
709B DD70               DW OUTCHR       ; 18H -  "   "
709D DD70               DW OUTCHR       ; 19H -  "   "
709F DD70               DW OUTCHR       ; 1AH -  "   "
70A1 DD70               DW OUTCHR       ; 1BH -  "   "
70A3 DD70               DW OUTCHR       ; 1CH -  "   "
70A5 DD70               DW OUTCHR       ; 1DH -  "   "
70A7 DD70               DW OUTCHR       ; 1EH -  "   "
70A9 DD70               DW OUTCHR       ; 1FH -  "   "

70AB F1         FILEND  POP AF          ; ABORT PRINTING
70AC DDE1       FILE01  POP IX          ; The control code 07H will
70AE C1                 POP BC          ; abort printing for the
70AF D1                 POP DE          ; rest of the present line.
70B0 3A6774             LD A,(MODE)
70B3 326B74             LD (STR04),A
```

TECO®



HIGH RESOLUTION GREEN SCREEN MONITOR

- ★ Low Cost — High Performance
- ★ 12" Non Glare Green Display
- ★ Raster Scan for EIA Composite Input
- ★ Video Bandwidth 18MHZ (-3B)
- ★ Resolution 800 Lines (Centre) @ 20fl
- ★ Normal and Zoom Display
- ★ E.A. of NSW CERT No CS-2460N

NEW RELEASE

COMAX CMD-22
80 TRACKS DISK DRIVE

- ★ Fully Compatible with Apple Soft*
- ★ Double Sided 80 Tracks/Side
- ★ Storage Capacity: 640K Bytes (Formatted)
- ★ Track to Track Access Time: Less than 3 mSec
- ★ Encoding Method: MFM
- ★ Number of Heads: 2
- ★ Complete with Disk Controller Card
- ★ Drive Mechanism: Mitsubishi

DATATREE DATA CASSETTE

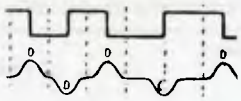
DATATREE offers you a professional cassette unit — DATA CASSETTE — which is specially designed with **SQUARE WAVE OUTPUT** to ensure 100% data transmission.
DATACASSETTE also have built-in counter, SAVE indicator, PAUSE and AUTO STOP . . . etc. All these make your data store/recall an easy thing — fast accurate!
DATA CASSETTE is compatible with **all kinds of home computers.** It's the best choice and it's at incredible low cost!

SPECIFICATIONS

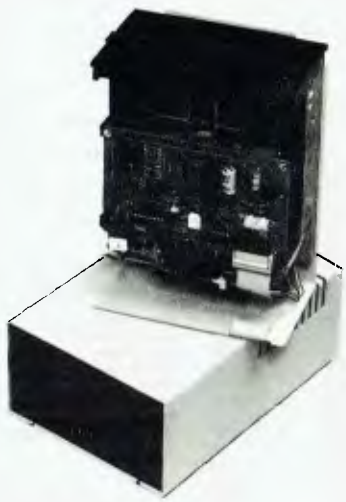
★ Square wave output, 100% data transmission

DATA CASSETTE .....

Cammon cassette player.....



- ★ Stable output voltage 2.5V, no need to adjust.
- ★ Frequency response: 100Hz to 6.3K Hz + dB.
- ★ Input/Output impedance: 10K ohm.
- ★ Tape speed allowance: +3% to -2.5%.
- ★ Wow and flutter: Wrms 0.35%.
- ★ Power: 240V AC 50Hz.
- ★ Built-in counter, SAVE indicator, PAUSE and AUTO STOP function.
- ★ Size: 198 x 158 x 55 mm, 7-7/8" x 6-1/4" x 2-1/8".
- ★ Weight: N. W. 700g.



AD-201 DISK DRIVE

- ★Use Shugart Mechanism
- ★Run all Apple II* Software
- ★Low Cost

Aviette

FDD-820 SLIM-LINE 5¼" DISK DRIVE

- ★Latest USA technology from Tandon
- ★No noise — super quiet
- ★Patterned switch for normal read only and write by-pass selection
- ★Fully compatible with Apple II* or Apple IIe* software
- ★High precision positioning
- ★Low cost

1¾" SUPER THIN

AD-302 SUPER COOLING FAN

- ★1¾ Super thin body
- ★Australian standard 3 pin power plug
- ★Easy installation, just clip on your Apple II
- ★Entire system controlled by one front power switch
- ★Power light indicator
- ★Dual auxiliary outlets
- ★Line surge suppression device built-in

DIGITAL SOURCE INT'L PTY. LTD.

(AUSTRALIAN IMPORTER)

169 Phillip Street, Waterloo N.S.W. 2017. Telephone: (02) 690 1268 Telex: AA 75406

DEALER ENQUIRIES WELCOME

```
70B6 C30C70          JP SET02

70B9 13       GRPMOD INC DE          ; CHANGE GRAPHIC MODE
70BA 1A              LD A,(DE)       ; Each mode is represented
70BB D630            SUB 30H         ; by a number from 0 to 6.
70BD FE07            CP 07
70BF 3802            JR C GM05       ; Jump if valid.
70C1 1B              DEC DE          ; Otherwise reset mode to
70C2 AF       GM04   XOR A           ; 0 - Printer characters.
70C3 326774   GM05   LD (MODE),A
70C6 13       GM08   INC DE
70C7 D5       GM09   PUSH DE         ; Count up number of
70C8 0E00            LD C,0          ; printable characters.
70CA 1A       GM10   LD A,(DE)
70CB FE0D            CP CR
70CD 2808            JR Z GM20
70CF FE20            CP 20H
70D1 3804            JR C GM20
70D3 13              INC DE
70D4 0C              INC C
70D5 18F3            JR GM10
70D7 79       GM20   LD A,C
70D8 326D74   GM21   LD (CHRCNT),A   ; Store value.
70DB D1       GM22   POP DE
70DC C9              RET

                     ; OUTPUT CHAR. AT (DE) TO PRINTER.
                     ;
70DD 1A       OUTCHR LD A,(DE)
70DE CD9A73          CALL PRINT
70E1 13              INC DE
70E2 C30770          JP GM09
70E5 DDCB00E6 DBWTON SET 4,(IX+00)   ; DOUBLE WIDTH ON
70E9 C3DD70          JP OUTCHR

70EC 3E14     DBWTOF LD A,DWD        ; DOUBLE WIDTH OFF
70EE CD9A73          CALL PRINT
70F1 13              INC DE
70F2 DDCB00A6        RES 4,(IX+00)
70F6 C30770          JP GM09

                     ; SEND OUT CARRIAGE RETURN/LINE FEED
                     ;
70F9 1A       CRADLF LD A,(DE)
70FA CD9A73          CALL PRINT
70FD CDC271          CALL LEFFED
7100 3E0A            LD A,LEF        ; NOTE: Remove if
7102 CD9A73          CALL PRINT      ; line feed automatic.
7105 DDCB0066        BIT 4,(IX+00)
7109 2805            JR Z CRF25
710B 3E0E            LD A,0EH
710D CD9A73          CALL PRINT
7110 3A6A74   CRF25  LD A,(BCNT)
7113 3D              DEC A
7114 326A74          LD (BCNT),A
7117 DDCB00CE        SET 1,(IX+00)
711B C2A571          JP NZ CRF40
711E DDCB008E        RES 1,(IX+00)
7122 C3AB70          JP FILEND
7125 DDCB00EE CRF30  SET 5,(IX+00)   ; Set up small char.
7129 DDCB00B6        RES 6,(IX+00)   ;
712D 3A6774          LD A,(MODE)
7130 326874          LD (STR04),A
7133 326C74          LD (STR06),A
7136 3A6774   CRF32  LD A,(MODE)     ; Set up character format.
7139 A7              AND A
713A 200C            JR NZ CRF33
713C 3E01            LD A,1
713E 326A74          LD (BCNT),A
7141 3E0C            LD A,12
7143 327474          LD (LFLTH),A
7146 1B3A            JR CRF35
7148 FE03     CRF33  CP 3
714A 382C            JR C CRF29
714C FE05            CP 5
714E 3818            JR C CRF34
7150 FE07            CP 7
7152 302E            JR NC CRF35
7154 DDCB00AE        RES 5,(IX+00) ; LARGE
7158 DDCB00F6        SET 6,(IX+00)
715C 3E08            LD A,8
715E 326A74          LD (BCNT),A
7161 3E08            LD A,8
7163 327474          LD (LFLTH),A
7166 183D            JR CRF40
7168 DDCB00AE CRF34  RES 5,(IX+00)   ; MEDIUM
716C 3E04            LD A,4
716E 326A74          LD (BCNT),A
7171 3E08            LD A,8
7173 327474          LD (LFLTH),A
7176 180A            JR CRF35
7178 3E02     CRF29  LD A,2
717A 326A74          LD (BCNT),A
717D 3E08            LD A,8
717F 327474          LD (LFLTH),A
7182 1A       CRF35  LD A,(DE)
7183 FE0D            CP CR
7185 281E            JR Z CRF40
7187 FE02            CP GRP
7189 2807            JR Z CRF37
718B FE05            CP 05H
718D 2803            JR Z CRF37
718F 13       CRF36  INC DE
7190 18F0            JR CRF35
7192 CDB970   CRF37  CALL GRPMOD
7195 3A6774          LD A,(MODE)
7198 4F              LD C,A
7199 3A6C74          LD A,(STR06)
719C B9              CP C
719D 30F0            JR NC CRF36
719F 79              LD A,C
71A0 326C74          LD (STR06),A
71A3 1891            JR CRF32
71A5 119D73   CRF40  LD DE,BUFFER    ; Scan buffer for mode
71A8 ED536874        LD (STR03),DE   ; change character.
71AC 1A              LD A,(DE)
71AD FE02            CP GRP
71AF 200C            JR NZ CRF50
71B1 CDB970   CRFB9  CALL GRPMOD
71B4 1806            JR CRF47
71B6 3A6874   CRF45  LD A,(STR04)
71B9 326774          LD (MODE),A
71BC C9       CRF47  RET
71BD CDC770   CRF50  CALL GM09
71C0 18F4            JR CRF45

71C2 3E1B     LEFFED LD A,ESC        ; SET LINE FEED LENGTH
71C4 CD9A73          CALL PRINT
71C7 3E41            LD A,"A"
71C9 CD9A73          CALL PRINT
71CC 3A6A74          LD A,(BCNT)
71CF 3D              DEC A
71D0 3E08            LD A,8
71D2 2003            JR NZ LEF02
71D4 3A7474          LD A,(LFLTH)
71D7 C39A73   LEF02  JP PRINT

71DA 3A6D74   SCHRST LD A,(CHRCNT)   ; PRINTER CHARACTERS
71DD A7              AND A
71DE C8              RET Z
71DF 47              LD B,A
71E0 DDCB004E SCHR04 BIT 1,(IX+00)
71E4 2003            JR NZ SCHR05
71E6 1A              LD A,(DE)
71E7 1802            JR SCHR06
71E9 3E20     SCHR05 LD A,20H
71EB CD9A73   SCHR06 CALL PRINT
71EE 13              INC DE
71EF 10EF            DJNZ SCHR04
71F1 C9              RET
                     ; GRAPHIC MODE TABLE
71F2 DA71     GRPMDT DW SCHRST       ; 0 - PRINTER SET
71F4 2672            DW PCHR1T       ; 1 - SET ONE *1
71F6 5872            DW NCHR1T       ; 2 - SET TWO *1
71F8 6772            DW PCHR2T       ; 3 - SET ONE *2
71FA 6F72            DW NCHR2T       ; 4 - SET TWO *2
71FC 7772            DW PCHR4T       ; 5 - SET ONE *4
71FE 7F72            DW NCHR4T       ; 6 - SET TWO *4

                     ; RELATIVE POSITION TABLES
7200 FFFFD050 LARTAB DB 0FFH,0FFH,0D0H,050H ; Small
7204 03FFFFFF        DB 003H,0FFH,0FFH,0FFH
7208 FFF0B070        DB 0FFH,0F0H,0B0H,070H ; Medium
720C 3002FFFF        DB 030H,002H,0FFH,0FFH
7210 E0C0A080        DB 0E0H,0C0H,0A0H,080H ; Large
7214 60402000        DB 060H,040H,020H,000H
7218 F07001FF MEDTAB DB 0F0H,070H,001H,0FFH ; Small
721C 00000000        DB 000H,000H,000H,000H
7220 C0804000        DB 0C0H,080H,040H,000H ; Medium

7224 8000     SMLTAB DB 080H,000H            ; Small


7226 D5       PCHR1T PUSH DE         ; SET ONE *1
7227 3E08            LD A,SIWD       ; Character width.
7229 110000          LD DE,0
722C 210080   PC1T00 LD HL,SETNI     ; Table start.
722F DDCB0086        RES 0,(IX+00)
7233 226E74   PC1T01 LD (STP05),HL
7236 327274          LD (WIDTH),A
7239 212472          LD HL,SMLTAB
723C DDCB006E        BIT 5,(IX+00)
7240 200A            JR NZ PC1T08
7242 211872          LD HL,MEDTAB
7245 DDCB0076        BIT 6,(IX+00)
7249 2007            JR NZ PC1T10
724B 19              ADD HL,DE
724C 227074   PC1T09 LD (CPOSAD),HL
724F D1              POP DE
7250 1835            JR CHRPRT
7252 210072   PC1T10 LD HL,LARTAB
7255 19              ADD HL,DE
7256 18F4            JR PC1T08

7258 D5       NCHR1T PUSH DE         ; SET TWO *1
7259 110000          LD DE,0
725C 3E08            LD A,S2WD       ; Width.
725E 210090   NC1T00 LD HL,SETN2     ; Start of table.
7261 DDCB00C6        SET 0,(IX+00)
7265 18CC            JR PC1T01

7267 D5       PCHR2T PUSH DE         ; SET ONE *2
7268 110800          LD DE,8
726B 3E10            LD A,S1WD*2
726D 18BD            JR PC1T00

726F D5       NCHR2T PUSH DE         ; SET TWO *2
7270 110800          LD DE,8
7273 3E10            LD A,S2WD*2
7275 18E7            JR NC1T00

7277 D5       PCHR4T PUSH DE         ; SET ONE *4
7278 111000          LD DE,16
727B 3E20            LD A,S1WD*4
727D 18AD            JR PC1T00

727F D5       NCHR4T PUSH DE         ; SET TWO *4
7280 111000          LD DE,16
7283 3E20            LD A,S2WD*4
7285 18D7            JR NC1T00
```

THE EXECUTIVE 816 . . . . . A REAL COMPUTER IN A REAL BRIEFCASE MORE THAN TWICE THE DISK CAPACITY OF THE BASIC 2 DRIVE IBM PC ONLY $3395 INC TAX. INCLUDES ALL SOFTWARE

We think the two most important features to look for in a small business computer is the quality of the sofwtare and the capacity of it's drives. Let's take these two points one at a time and look at the Executive 816.
Why is the drive capacity so important? Well for instance, it is usually most efficient to adjust your stock and debtors records as you write up your customer invoices That needs them all to be on in the drives at the same time. Then again with good sized disk storage your database can be a usable size, or you can store a really substantial amount of text from your word-processor as well as a good sized dictionary to check your spelling. Unless you have a midget business you are unlikely to be able to do this with less than 1,500 kilobytes of storage. The Executive 816 has nearly 1,600 kilobytes of storage built in to two slimline drives. As a comparison, the Model 3 or 4 TRS 80 have 750 kilobytes, the basic 2 drive IBM PC has 750 kilobytes. The 2 drive Apple 2e has a measly 286K storage.
So what does it all mean? Simply that even though it comes in a small portable package the 816 is one of the most powerful computers available on the market at anywhere near it's price bracket.
The second issue is the quality of the software. The 816 comes with an enhanced CP/M 2.2 operating system developed by Mark Henry of Compak Microcomputer Products. It is menu driven, You don't need to understand A> or PIP or Stat or any of the other built in CP/M commands. Just choose the option from the menu and the computer tells you what to do. Follow the yellow brick road. You can copy, format, look at the directory, run programmes, set up communications or even get into CP/M itself. The 816 can read 5" disks from the DEC Rainbow 100, IBM PC(CP/M 86),. Kaypro, Cromemco, Osborne, HP 125, Morrow Micro Decision,. Televideo 802/803, Archives 2 and soon even more disk formats.

THE 816 COMES WITH THIS QUALITY SOFTWARE. FREE WITH NO HIDDEN CHARGES.

IMS ACCOUNTING . . . FOR THE BUSINESSMAN
The acknowledged market leader, with fully integrated Debtor, Creditors and Stock. The General Ledger has a pre-defined chart of accounts or you can define your own. Several departments? No problem. You can have separate reports for up to 99 departments, and the Debtors and Creditors will automatically transfer totals to the General Ledger.
Reports include — month by month and year-to-date totals for Trial balance, Profit & Loss Account and Balance Sheet. For regular items — use the standing journal. Comparative Profit & Loss — of course. Slow debtors — automatically send collection letters. Updates stock items as the customer's invoice is printed. Automatic Creditor payments. Aged Trial Balances, et, etc.

IF YOU ARE THINKING OF BUYING IMS IN ITS OWN RIGHT — DON'T — GET A FREE COMPUTER AS WELL FROM US.

OFFICE COSTING ANALYSIS SYSTEM . . . . .FOR THE ACCOUNTANT SOLICITOR ARCHITECT etc
OCAS is a system for keeping records of office costs and providing various reports regarding these costs. Costs can be either time related or fixed cost.
Normal monthly reports cover client reports detailing client jobs, and the associated time and costs; staff reports covering the jobs performed for individual clients; and task reports listing the staff involved.
Client accounts can be maintained, producing statements of any time and ageing reports to keep track of overdue accounts. With the 816's disk capacity, it is possible to keep 2000 entries in each of staff, tests, and transactions per month.

MEMBERSHIP MAINTENANCE SYSTEM . . . . . FOR THE CLUB SECRETARY
Instead of being limited to primitive, labour intensive and slow management systems which are prone to error, you now can move into modern cost effective methods to handle on line telephone and over counter enquiries, as well as accounting and mailing, and has the flexibility to adapt to your needs while requiring less skill than a manual system.
You can print address labels, with selective mailing, membership renewal notices suitable for window faced envelopes, cash summaries for banking, etc, while information stored for each member can include home and business telephone number, age, sex, marital status, date joined, date paid up to, current financial standing, etc, as well as your own special requirements.
Membership records can be accessed by the alphanumeric code or by surname. With the 816's enormous disk capacity, one disk can hold, if needed, records for approx. 2,500 members!

PROJECT COSTING SYSTEM . . . . . FOR THE BUSINESSMAN
Need to track jobs as they move through your organisation?
No need to create a special programme as the ARM Data Base has been specially configured to cover the project costing.
As in the Database itself, everything is menu driven and there are no complex commands to learn; sample files are also provided for a "hands-on" demonstration.

ALMOST EVERY BUSINESS NEEDS THREE TYPES OF SOFTWARE. A WORD PROCESSOR, A DATABASE AND A SPREADSHEET.

THE 816 COMES WITH:

SUPERWRITER (including spelling checker)
The newest in Word Processing from the creators of the famous Super Calc programme, also incorporates a full on-screen help function, and an integrated dictionary of over 20,000 words, which customises itself to your vocabulary.
Form letters or mailing lists are also included in the package — no need for expensive extra programmes.
A Print Spooler is also on-line. Print while you type the next document. Above all, Super Writer is very easy to learn and use.

A DATABASE
From Australia comes the ARM Data-Base, with forms management. It is not just a file management system.
There are no complex commands, and the quality and sophistication of the data-base make the system easy to use; everything is menu driven and a demonstration data-base is supplied.

SUPERCALC
One of the best known and supported spread-sheet programmes is also supplied free with the 816.
The work space available is a massive 29K, compared with some others at 11K.
You have 64 columns and 256 rows to use.
Vary the width of individual columns at will; headings automatically extend across vacant cells; a help function is always available on screen; and of course, all the usual spread sheet functions.
Cash flow, budgets, and 'what if?' situations are a breeze using Super Calc. The only limitation is your own imagination, and we have several books on Super Calc to help you with ideas.

And finally the 816 comes complete with two utilities:

COMMUNICATIONS SOFTWARE XMIT/RECV, to permit files or programmes to be transmitted from one machine to another at up to 9600 baud through the RS232 port. (Of course, the "other" computer needs it's correct XMIT/RECV programme to make it work.)

DISK EDITOR AND DIAGNOSTIC . . . . . to repair clobbered disks.

SPECIFICATIONS
Z80A, 4MHZ, 64K RAM, 2 x 5¼ D/S D/D disk drives of 1.6 megabyte approx. Provision for 2 more 8" or 5¼" drives, Centronics printer port, 2 RS232 serial ports, CPM 2.2, 5" 80 x 25 CRT Green Phosphor, RCA external monitor conenction, 110/240 volt, 5 function keys, cursor keys, Mouse Capability.

NOT ONLY IS THE AMUST EXECUTIVE 816 ONE OF THE MOST POWERFUL SYSTEMS AVAILABLE TODAY — BUT THE MOST PORTABLE, FASHIONABLE AND EASIEST TO USE

COMPAK
Compak Computer Centre
THE HOME OF THE 816

350 SOUTH ROAD, MOORABBIN 3189
Telephone: (03) 555 9844

Amust Computer Corporation Australia

presents

the Executive 816 Portable Briefcase Computer

PRINT BIG

```
                ; STANDARD PRINT ROUTINE
                ;
7287 3A6D74     CHRPRT LD A,(CHRCNT)
728A A7                AND A
728B C8                RET Z                ; Return if no more chars.
728C CD0B73            CALL SETPRT
728F 0E01       CHPT04 LD C,1
7291 D5         CHPT06 PUSH DE
7292 1A                LD A,(DE)            ; Next character.
7293 ED5B6E74          LD DE,(STR05)
7297 CD6B73            CALL GETCHR          ; Find in character table.

729A 3A6A74            LD A,(BCNT)
729D 3D                DEC A
729E 5F                LD E,A
729F 1600              LD D,0
72A1 FD2A7074          LD IY,(CPOSAD)
72A5 FD19              ADD IY,DE
72A7 FD7E00            LD A,(IY+00)
72AA 0F                RRCA
72AB 0F                RRCA
72AC 0F                RRCA
72AD 0F                RRCA
72AE E60F              AND 0FH
72B0 2804              JR Z CHPT12
72B2 29         CHPT10 ADD HL,HL
72B3 3D                DEC A
72B4 20FC              JR NZ CHPT10
72B6 3A6774     CHPT12 LD A,(MODE)
72B9 FE05              CP 5
72BB 300C              JR NC CHPT14         ; Jump modes 5 & 6.
72BD FE03              CP 3
72BF 300D              JR NC CHPT16         ; Jump modes 3 & 4.
72C1 3E01              LD A,1               ; Modes 1 & 2.
72C3 327374            LD (CNT),A
72C6 7C                LD A,H
72C7 1808              JR CHPT18
72C9 CD3873     CHPT14 CALL M1D4DT          ; Four times bigger.
72CC 1803              JR CHPT18
72CE CD4D73     CHPT16 CALL M1D2DT          ; Two times bigger.

72D1 5F         CHPT18 LD E,A
72D2 FD7E00            LD A,(IY+00)
72D5 3C                INC A
72D6 2003              JR NZ CHPT19
72D8 5F                LD E,A
72D9 180A              JR CHPT24
72DB 3D         CHPT19 DEC A
72DC E60F              AND 0FH
72DE 2805              JR Z CHPT24
72E0 CB3B       CHPT20 SRL E
72E2 3D                DEC A
72E3 20FB              JR NZ CHPT20
72E5 3A7374     CHPT24 LD A,(CNT)
72E8 47                LD B,A
72E9 7B                LD A,E

72EA CD9A73     CHPT30 CALL PRINT           ; Print one dot column
72ED 10FB              DJNZ CHPT30          ; using the printers
72EF D1                POP DE               ; definable graphic
72F0 0C                INC C                          facility.
72F1 79                LD A,C
72F2 DDCB0046          BIT 0,(IX+00)
72F6 2004              JR NZ CHPT35
72F8 FE09              CP SIWD+1
72FA 1802              JR CHPT40
72FC FE09       CHPT35 CP S2WD+1
72FE 3891       CHPT40 JR C CHPT06
7300 13                INC DE
7301 3A6D74            LD A,(CHRCNT)
7304 3D                DEC A
7305 326D74            LD (CHRCNT),A
7308 2085              JR NZ CHPT04
730A C9                RET


730B D5         SETPPT PUSH DE              ; SET UP PRINTER FOR
730C 3A7274            LD A,(WIDTH)         ; GRAPHICS
730F 47                LD B,A               ; Find number of dot columns
7310 3A6D74            LD A,(CHRCNT)        ; alone present line.
7313 5F                LD E,A
7314 1600              LD D,0
7316 210000            LD HL,0
7319 19         STP05  ADD HL,DE
731A 10FD              DJNZ STP05
731C 3E1B       STP10  LD A,ESC             ; Send information to
731E CD9A73            CALL PRINT           ; printer.
7321 3E4B              LD A,"K"
7323 DDCB0056          BIT 2,(IX+00)
7327 2802              JR Z STP15
7329 3E4C              LD A,"L"
732B CD9A73     STP15  CALL PRINT
732E 7D                LD A,L
732F CD9A73            CALL PRINT
7332 7C                LD A,H
7333 CD9A73            CALL PRINT
7336 D1                POP DE
7337 C9                RET
7338 AF         M1D4DT XOR A                ; FOUR TIMES NORMAL SIZE
7339 CB7C              BIT 7,H              ; Spread each bit over
733B 2802              JR Z M1D4D2          ; four bits.
733D C6F0              ADD A,0F0H
733F CB74       M1D4D2 BIT 6,H
7341 2802              JR Z M1D4D4
7343 C60F              ADD A,0FH
7345 5F         M1D4D4 LD E,A
7346 3E04              LD A,4

7348 327374     M1D4D5 LD (CNT),A
734B 7B                LD A,E
734C C9                RET
734D AF         M1D2DT XOR A                ; TWICE NORMAL SIZE
734E CB7C              BIT 7,H              ; Spread each bit over
7350 2802              JR Z M1D2D1          ; two bits.
7352 F6C0              OR 0C0H
7354 CB74       M1D2D1 BIT 6,H
7356 2802              JR Z M1D2D2
7358 F630              OR 30H
735A CB6C       M1D2D2 BIT 5,H
735C 2802              JR Z M1D2D3
735E F60C              OR 0CH
7360 CB64       M1D2D3 BIT 4,H
7362 2802              JR Z M1D2D4
7364 F603              OR 03H
7366 5F         M1D2D4 LD E,A
7367 3E02              LD A,2
7369 18DD              JR M1D4D5
736B DDCB0046   GETCHR BIT 0,(IX+00)       ; FIND CHARACTER IN
736F 2808              JR Z GTC00           ; TABLE
7371 D620              SUB 20H              ; Tables start from 20H.


7373 FEE0              CP 0E0H
7375 3809              JR C GTC02
7377 1806              JR GTC01
7379 D620       GTC00  SUB 20H
737B FE60              CP 60H
737D 3801              JR C GTC02
737F AF         GTC01  XOR A
7380 6F         GTC02  LD L,A
7381 2600              LD H,0

7383 29                ADD HL,HL            ; Index into table by
7384 29                ADD HL,HL            ; multiplying by 16.
7385 29                ADD HL,HL
7386 29                ADD HL,HL
7387 19                ADD HL,DE            ; Add start address.
7388 EB                EX DE,HL
7389 0610              LD B,16
738B C5         GTC03  PUSH BC              ; Collect column of 16
738C 41                LD B,C               ; bits in HL.
738D 1A                LD A,(DE)


738E 0F                RRCA
738F 07         GTC05  RLCA
7390 10FD              DJNZ GTC05
7392 87                ADD A,A
7393 ED6A              ADC HL,HL
7395 13                INC DE
7396 C1                POP BC
7397 10F2              DJNZ GTC03
7399 C9                RET
739A F5         PRINT  PUSH AF              ; OUTPUT TO PRINTER

                ;
                ; ENTER CODE TO SEND ONE CHARACTER
                ; TO THE PRINTER.
                ; AF can be affected.
                ;
739B F1                POP AF
739C C9                RET
                ; Program workspace.
                BUFFER DS 200               ; Line storage buffer.
                LINPOS DS 2                 ; Position in buffer.
                MODE   DS 1                 ; Graphic mode 0-9.
                STR03  DS 2                 ; Current post. on line.
                BCNT   DS 1                 ; Block counter.
                STR04  DS 1                 ; Temporary mode store.
                STR06  DS 1
                CHPCNT DS 1                 ; No. of Values.
                STR05  DS 2                 ; Temporary table address.
                CPOSAD DS 2                 ; Char. post. add.
                WIDTH  DS 1
                CNT    DS 1
                LFLTH  DS 1
                FLAG   DS 1                 ; Flag byte.
                                          ; (IX+00)

                      ; Bit 0 - Set for S2WD/ Otherwise S1WD (MAT)
                      ; Bit 1 - Set when standard char. printed.
                      ; Bit 2
                      ; Bit 3 - Set not to print printer chars.
                      ; Bit 4 - Set when double width is on.
                      ; Bit 5 - Set for small letters/ Reset,BIT 6
                      ; Bit 6 - Set, large/Reset, medium letters.
                      ; Bit 7
```

Macro assembler listing

NEWCOMERS START HERE

This is our unique quick-reference guide, reprinted every month to help our readers pick their way through the most important pieces of (necessary) jargon found in APC. While it's in no way totally comprehensive, we trust you'll find it a useful introduction. Happy microcomputing!

Probably the first thing you noticed on picking up this magazine for the first time was the enormous amount of unintelligible-looking jargon. Well, in the words of *The Hitch-hikers' Guide to the Galaxy*, don't panic! Baffling as it may sound, the jargon does actually serve a useful purpose. It's a lot easier to say VDU, for example, than 'the screen on which the computer's output is displayed'. This guide is intended to help you find your way around some of the more common 'buzzwords' you're likely to come across in the pages of *APC*.

For those completely new to computing, let's start with the question: what is a microcomputer? We can think of a micro as a general-purpose device as opposed to a typewriter which can only be used for typing, a calculator to perform calculations, a filing-cabinet to file information and so on. A micro can do all those things and more.

If it is to be of any use, a general-purpose device needs some way of having a function assigned to it. We do this by giving the computer a set of logical instructions called a **program**. The general term for computer programs is **software**. Every other part of a microcomputer system is known as **hardware**. 'If you can touch it, it's hardware.'

Programs must be written in a form the micro can recognise and act on — this is achieved by writing the instructions in a code known as a **computer language**. There are literally hundreds of different languages around, the most popular of these being **Basic**. Basic is an acronym of **B**eginners' **A**ll-purpose **S**ymbolic **I**nstruction **C**ode. Although originally intended only as a simple introductory language, Basic is now a powerful and widely-used language in its own right.

Other languages you're likely to come across in *APC* include **Forth, Pascal, C** and **Comal**. These are known as **high-level** languages because they approach the sophistication of a human language. You'll also see references to the **low-level** languages, **assembly language** and **machine code**. We'll look at high and low-level languages in a moment.

The heart of a micro, the workhorse, is the **processor** or **Central Processing Unit (CPU)**. The processor usually consists of a single silicon chip. As with computer languages, there are a number of different types of processor around, the Z80, 6502 and 8088 being the three most common. The processor is nothing magical — it's just a bunch of electronic circuits. It's definitely not a 'brain'.

Being electronic, the processor's circuitry can be in one of two states: on or off. We represent these two states by **binary** (base two) notation, the two binary digits (known as **'bits'**) being 0 and 1. It is possible to program computers in binary notation, otherwise known as **machine code** (or machine language) programming.

Machine code is called a low-level language because it operates at a level close to that 'understood' by the processor. (Languages like Basic are known as high-level languages because they are symbolic, operating at a level easily understood by people but not directly understood by the processor.)

Between high-level languages and machine code is a low-level language known as **assembly language** or, colloquially, **assembler**. This is a mnemonic code using symbols which the processor can quickly convert to machine code.

Since there is no binary equivalent of a comma or the letter 'a', for example, we need some sort of code to represent each character to be processed by the computer. In order to simplify communication between computers, a number of standard codes have been agreed on. The most widely used of these codes is the American Standard Code for Information Interchange, **ASCII**. This system assigns each character a decimal number which the processor can then convert to its binary equivalent.

There are two types of program to do this translation for us. The first of these is a **compiler** which translates our whole program permanently into machine code. When we compile a program, the original high-level language version is called the **source code** while the compiled copy is called the **object code**. Compiled programs are fast to run but hard to edit. (If we want to change a compiled program, we either have to edit it in machine code (extremely difficult) or we have to go back to a copy of the source code.) For this reason there is a second translation program: an **interpreter**. An interpreter waits until we actually run (use) the program, then translates one line at a time into machine code — leaving the program in its original high-level language. This makes it slower to run than a compiled program, but easier to edit.

There are two strange-sounding Basic words you're likely to come across: **POKE** and **PEEK**. When you program in a high-level language, you are normally unable to choose which part of the machine's memory the processor will use to store things. This makes programming easier as you don't need to worry about memory locations, but slows down the program since the processor has to 'look up' addresses for you. Using the POKE command, however, you can 'POKE' a value directly into a desired memory address. 'POKE 10000,56', for example, puts the value 56 into memory location 10000. PEEK allows you to examine the content of a particular memory address. If you were to follow the above POKE with 'PEEK 10000', the computer would respond by displaying the value 56. (POKEing and PEEKing is normally done to increase program speed. It's a compromise between Basic and machine code.)

So far, we have a processor and a program. Since a computer needs somewhere to store programs and data, it needs some kind of memory. There are two types of memory known as **R**ead **O**nly **M**emory **(ROM)** and the badly-named **R**andom **A**ccess **M**emory **(RAM)**. ROM is so-called because the processor can **'read'** (get things out of) its contents, but is unable to **'write** to' (put things in) it.

ROM is used to store **firmware**, which consists of software permanently available on the machine. An interpreter is a typical example of firmware (stick with it: it gets easier!).

RAM differs from ROM in two important ways. Firstly, you can write to it as well as read from it. This means that the processor can use it to store both the program it is running and data (information). The second important difference is that RAM needs a constant power-supply to retain its contents: as soon as you switch the computer off, you lose your program and data.

Memory is described in terms of the number of characters we can store in it. Each character is represented by an 8-bit binary number. 8 bits make one byte and 1024 bytes make one **kilobyte** or **1k**. 32k, for example means that the computer can store about 32000 characters in its memory. If 1024 sounds like an odd number, remember that everything is based on the binary system, thus 1,2,4,8,16 ... 1024 being the nearest binary multiple to 1000.

There are numerous forms of **permanent** or **backup** storage, but by far the most common are the **floppy disk** and **cassette**.

Floppy disks or diskettes are circular pieces of thin plastic coated with a magnetic recording surface similar to that of tapes. The disk, which is enclosed in a protective card cover, is placed in a **disk drive**. Disk drives comprise a high-speed motor to rotate the disk and a read/write head to record and 'playback' programs and data.

The disk is divided into concentric rings called **tracks** (similar to the tracks on an LP) which are in turn divided into small blocks by spoke-like divisions called **sectors**.

There are two methods for dividing the disk into sectors. One method is called **hard-sectoring**, where holes punched in the disk mark the sectors, and the other is **soft-sectoring** where the sectors are marked magnetically. (The reason that disks from one machine can't be read by a different make is that each manufacturer has its own way of dividing up the disk. Recently, however, manufacturers do seem to have begun to acknowledge that this situation can't go on forever, and they are working on making their disks compatible with each others.')

Since the computer needs some way of tracking the whereabouts of everything on the disk, we have a program called a **Disk Operating System**, more usually known simply as the **Operating System (DOS** or **OS)**. The operating system does all the 'house-keeping' of the disks, working out where to put things, letting the user know what is on the disk, copying from one disk to another and so on. As you might expect by now, there are lots of different operating systems available (each with its own advantages and disadvantages). The two most popular OSs are **CP/M** (Control Program for Micros) and **MS-DOS** (MicroSoft Disk Operating System).

Floppy disks provide a reasonably fast and efficient form of secondary storage and are cost-effective for business machines. For home computers, however, the usual form of program and data storage is on ordinary cassette tape using a standard cassette recorder. This method of storage is slow and unreliable, but is very cheap and is adequate for games and the like.

Another type of disk you'll see referred to is the **hard disk**. This is an extremely efficient method of storing large amounts of programs and data. Hard disk capacity generally starts at around 10 **Mbytes** (10 million bytes) and rises to ... well, you name it. Besides offering a much greater capacity than floppies, hard disks are more reliable and considerably faster. They are, however, much more expensive than floppy drives.

Since computers need some way of communicating with the outside world, we need input and output devices. Input and output devices include all manner of things from hard disk units to light-pens, but the minimum requirement for most applications is a typewriter-style **keyboard** for input and a tv-like **Visual Display Unit** for output. The Visual Display Unit is variously referred to as a **VDU**, **Cathode Ray Tube (CRT)** and **monitor**.

The various component parts of a computer system (processor, keyboard, VDU, disk drives, etc) may all be built in to a single unit or they may be separate, connected by cables.

Take this paragraph slowly and it makes sense! When a computer communicates with an outside device, be it a printer or another computer, it does so in one of two forms — **parallel** or **serial**. **Parallel input/output (I/O)** requires a number of parallel wires. Each wire carries one bit, so with 8 wires we can transmit/receive information one byte at a time (8 bits = one byte, remember). **Serial I/O**, in contrast, uses a single wire to transmit a series of bits one at a time with extra bits to mark the beginning and end of each byte.

To enable different devices to communicate with each other in this way, standards have been agreed for different **Interfaces**. An interface is simply a piece of circuitry used to connect two or more devices. The most common standard serial interface is the **RS232** (or **V24**) while the **Centronics** standard is popular for parallel interfaces.

When two computers want to communicate with each other over a distance, there are again two ways of doing it. Both methods use the public phone network. The simplest and cheapest method is to use a device known as an **acoustic coupler**. This simply plugs into your computer, and has a receptacle into which you place your telephone handset. However an acoustic coupler is slow and not exceptionally reliable.

A more sophisticated (and correspondingly more expensive) method is to use a **modem**. Unlike an acoustic coupler, a modem is wired into the telephone system and you should get permission for this from Telecom.

So, now you know!

SUPERIOR™ SOFTWARE FOR THE BBC MICROCOMPUTER NOW IN AUSTRALIA

ROAD RUNNER (32K) **$26.50 Disc**
The only full feature machine-code version of the arcade game available for the B.B.C. micro. Features include: scrolling screen, radar display, checkpoint flags, fuel gauge, smoke screens, 6 skill levels, rankings, increasing difficulty and sound effects.

GALAXIANS (32K) **$26.50 Disc**
Fast action version of the popular arcade game. 4 types of Galaxian (in 3 initial screen formations) swoop down individually or in groups of two or three. 6 skill levels, hi-score, rankings, bonus laser bases, increasing difficulty, superb graphics and sound.

CENTIPEDE (32K) **$26.50 Disc**
Incredible arcade type game featuring mushrooms, flies, snails, spiders, and the centipedes of course. Excellent graphics and sound. 6 skill levels, hi-score, rankings, bonuses, and increasing difficulty as the spiders become more active and the mushrooms increase.

FRUIT MACHINE (32K) **$26.50 Disc**
Probably the best fruit machine implementation on the markets. This program has it all . . .HOLD, NUDGE, GAMBLE, moving reels, realistic fruits and sound effects, multiple winning lines. This is THE fruit machine program to buy.

ALIEN DROPOUT (32K) **$26.50 Disc**
Based upon the arcade game of ZYGON, but our version improves upon the original arcade game itself. You have to shoot the aliens out of their "boxes" before the "boxes" fill up. Once full, the aliens fly down relentlessly, exploding as they hit the ground. Suitable for use with keyboard or joystick.

INVADERS (32K) **$26.50 Disc**
Superior version of the old classic arcade game including a few extras. 48 marching invaders drop bombs that erode your defences, and 2 types of spaceship fly over releasing large bombs that penetrate through your defences. Hi-score, increasing difficulty, superb sound effects and graphics.

SPACE FIGHTER (32K) **$26.50 Disc**
Arcade-style game based upon features from DEFENDER and SCRAMBLE. 5 types of menacing alien fire at you and may attempt to ram you. Separate attack phases, fuel dumps, asteroids, repeating laser cannon, smart bombs, hi-score, rankings, 6 skill levels, bonuses.

OTHER TITLES AVAILABLE:
COLDITZ, ADVENTURE, CRIBBAGE AND PONTOON

HUNCHBACK (32K) **$26.50**
An excellent version of the arcade game where Quasimodo attempts to rescue Esmeralda. Beautifully detailed animation (the best we've yet seen!) as Quasimodo leaps over the ramparts dodging rocks and arrows, swinging on ropes, avoiding the guards' spears, and ringing bells. Twelve different screens of action, starting easy and becoming extremely difficult. Choice of starting speed and skill level. A programming masterpiece! (For use with KEYBOARD or JOYSTICKS).
● ● ● NEW RELEASE ● ● ●

Q*BERT (32K) **$26.50**
A great new arcade game reaches the BBC micro. In this game, you have to move over a pyramid of blocks altering the colour of the blocks as you pass over them. Easy! Except that you have to avoid the balls, which tumble down towards you,and the pyramid's snake, which has a deadly sting. Transportation discs can be used to help you in your increasingly difficult task. Sound effects, hi-score, rankings, skill levels.
● ● ● NEW RELEASE ● ● ●

ALSO DEALERS FOR:
CLARES SOFTWARE

COMMUNICATIONS SUPPORT:
RS423/Acoustic coupler lead.....
Terminal Software $25
Acoustic Couplers .....
Improved Colour Video Output Kit $10
Light Pen, Utilities and Demo Tape $99

ALLOW **$2** FOR POSTAGE AND PACKING

HI-FLIGHT COMPUTING SERVICES
110 Mt Pleasant Road, Belmont, Vic 3216

R & A COMPUTER SUPPORT SYSTEMS
32 Hastings Avenue, Blackburn South, Vic 3130

PHONE ENQUIRIES: (052) 44 2715 ALL HOURS

Under New Management
MOLYMERX
Australia's broadest range of software for *TRS-80's and *SYSTEM-80's

MOLYMERX has the Australian distribution rights for literally hundreds of top grade programs from American, Canadian and British publishers. From games to utilities, from DOS's to Databases, if its top quality then MOLYMERX almost certainly has it.
Now, Molymerx is being distributed in Australia by MICRO-80, publisher of Australia's leading software magazine dedicated to TRS-80's/System-80's, so you are assured of the best possible support.
To help you choose from the incredibly wide range of programs available, you may purchase a MOLYMERX catalogue. For only $3.00 you receive over 80 pages of what is virtually an encyclopaedia of '80 software plus regular updates for 12 months. The useful information contained in this catalogue is worth many times its cost.
If you already have a catalogue, you may send your orders direct to MICRO-80 at the address shown below.
There are now generous BULK BUYING DISCOUNTS of up to 15% off list price for single orders in excess of $500. So, if you have friends with similar computers or belong to a Users Group you you can club together and save yourselves real $$$. Full details are in the catalogue.
Don't delay use the coupon below to order your MOLYMERX CATALOGUE and unlock the door to high quality Software for your computer.
For even faster service, Telephone your order for Software or Catalogue to (08) 211 7244 (4 lines)

PLEASE SEND ME A MOLYMERX CATALOGUE
(a) ☐ I enclose a cheque for $3.00
(b) ☐ Please debit my Bankcard

Name:
Address:
P/Code:
Bankcard No:
Exp. Date:
Signature:

TO: MICRO-80
P.O. BOX 213
GOODWOOD, S.A. 5034

BULLETIN BOARDS
GET ON THE PHONE TO YOUR MICRO

Peter Tootill and Steve Withers give the uninitiated an insight into the esoteric world of bulletin boards.

Most micro hobbyists will have been asked: 'But what do you do with it?' when a friend finds out that they have a micro at home. When we tell them what we do with ours, the usual follow up is 'What on earth is a Computer Bulletin Board?'

So, what is a computer 'Bulletin Board System' (BBS for short)? Well, the idea started in the USA, when a computer club decided that pinning notices and messages to other members on a cork board on the wall was a bit far behind the times for a high technology outfit like theirs. They decided to hook a computer to a telephone and allow people with micros, or even ordinary terminals, to dial in and post messages on this system. The idea caught on, and was taken up by other clubs and by individuals with the result that today there are at least a thousand, maybe many more public BBSs operating in North America. Sophisticated BBS software is now available for most of the popular micros; the facilities provided have developed considerably, and recent systems will allow callers to do a wide range of things. However, the main emphasis is still on the traditional message and mailbox facilities. Most BBSs will tell you if you have a message waiting when you call and let you search for messages on a particular subject. Messages can be private or public, general interest or collected into special categories. Other usual features you sometimes find are information and news files, help for inexperienced users, software to 'download' games and diversions, commercial sections, and even advertising.

"How do I use such a system?" you might ask yourself. The essentials are an ordinary telephone, a modem, and a terminal of some sort, which for most people will be a microcomputer with an RS232 (or V24) interface and some sort of terminal software. Let's take the list in reverse order (except for the telephone, which you will have to see Beepa about!).

Dumb and smart terminals

Software which makes your microcomputer act like a computer terminal is readily available in the 'public domain' (i.e. free of charge) for most micros. User groups will normally be able to help out with this. Commercial software is also available which usually, but not always, provides more facilities than the free stuff.

RS232 settings that should work with most BBS:
8 bit word
No parity
1 stop bit
Most terminal software ignores parity, so this setting will normally work satisfactorily, and give the added possibility of transferring binary data using standard CP/M protocols (which aren't just for CP/M
systems). More about this in 'Network News' in the near future.

Fig 2

The software is divided into two main categories, often referred to as 'dumb' and 'smart' terminal programs. The 'dumb' type is quite adequate for your first steps into the world of computer communications and for using most of the facilities of a BBS. A dumb terminal package is often provided with an RS232 interface if your micro doesn't include one.

The main advantage of a 'smart' terminal program is the ability to save incoming data to disk or tape. This is essential for 'downloading' or receiving software over the telephone line from the BBS, and useful for saving messages and other information for later perusal with the phone firmly back on the hook!

A dumb terminal program is very simple to write for yourself; all that is required is a routine to take what you type at the keyboard and transfer it to the RS232 port, and another to display incoming data from the RS232 on the screen. This can be done in Basic on most systems, provided that the interpreter is fast enough to keep up with the 30 characters a second that will be coming down the line at 300 bits/sec, the speed at which most of these systems operate.

Serial interface

The RS232 interface (or V24, or RS423; they are basically the same) is simply a device to convert the *parallel* data that the computer uses into *serial* data. That is from 8 bits in parallel, one on each of 8 wires, to 8 bits one after the other on one wire (two if you include the 'ground' or earth wire). This is

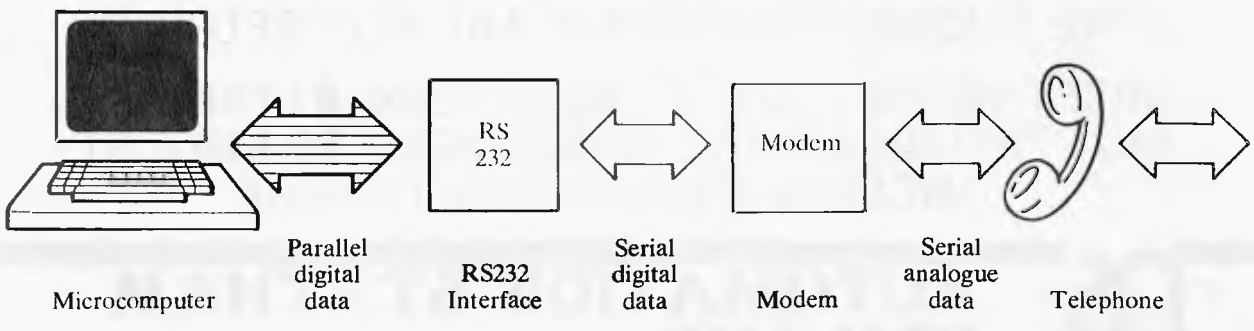


Fig 1

PROFESSIONALS ARE DELIGHTED WITH THE PERFORMANCE OF THE MORROW MICRODECISION

(THE BUDGET CONSCIOUS ARE PLEASED TOO)

MD2 TWO DISC DRIVES SSDD 400K **$1795** & ST
MD3 TWO DISC DRIVES DSDD 800K **$2440** & ST
INCLUDES $1800 OF SOFTWARE

AUTOMATION STATHAM PTY. LTD.

47 BIRCH STREET, BANKSTOWN, NSW 2200, AUSTRALIA.
TELEPHONE: (02) 709 4144. TELEX: AA 73316.

essential if the data is going to travel on the telephone system which has two wires. (The other wires you may find between the modem and the RS232 interface are for control signals, and not data).

Modems

The final stage is for the *modem* to take the serial *digital* data and convert it into serial *analogue* data; that is, to translate it into a form with which the telephone system, being designed to handle the electrical equivalent of sounds, can cope (see Fig 1). The digital, or on/off signals are converted into signals of two different frequencies representing the 0s and 1s of the computer's digital data.

Modems come in two basic forms, acoustically coupled, in which you put the telephone handset in a pair of rubber cups on the modem, and 'hard wired' or 'direct connect', which connect directly to the telephone wires, usually by means of a plug and socket. The latter are normally more reliable as they don't suffer from the inherent loss of efficiency arising from converting the signals into sound waves and back again. Acoustic types can also suffer from the effects of background room noise, (a cushion or a blanket can help with that problem).

Another variation in modems is that some are 'originate' only and some are 'originate/answer' types. To establish communications between two modems at opposite ends of a telephone line, one must be in originate mode, the other in answer mode. Normally the person who dials the number will set his modem to originate and the one receiving the call will be in answer mode. This is often handled automatically by direct connect modems, especially with a bulletin board, which will normally use what is called an 'auto-answer' modem which actually answers the phone by itself. Note that two 'originate only' modems cannot talk to each other.

The reason for the two modes is that, in this sort of application, data will be travelling in both directions on the wires at the same time (called 'full duplex'). This is so that the receiving system can ECHO back what it receives to the sender, who can see if it has been corrupted on the way. The two streams of data are kept separate by using two different frequencies, with the originator using one and the receiver the second. In some situations the echoing is done by the modem at your end, or even by your terminal software, this is called half duplex mode.

Using a BBS

The procedure for using a BBS is first of all to set your RS232 to one of the standards shown in Fig 2. Your RS232 manual should help if you have problems. Now load the software (this sometimes has the facilities to set the RS232 built into it), switch on the modem, and dial the number of the chosen system (see 'Network News' for a list of some available numbers), taking care to note whether the BBS operates normally, or expects you to ring twice (the so called 'ring back' method).

If you get a human answering the phone, don't drop it in surprise. The BBS may be off the air for some reason, and the operator (usually called the 'sysop') will be able to tell you what's happening and when to try again. There is also the chance that the number you have is wrong or out of date, so hang on to the phone and ask! If you are successful, you should hear a whistling noise from the other end.

When you do, switch your modem 'online', or put the telephone handset in the coupler. The carrier detect light, if the modem has one, should come on more or less immediately. If it doesn't, make sure that your modem is set to 'originate' mode. If it is an originate/answer type it will have a switch to select the mode somewhere on it and if such a switch is not visible you can assume it is originate only. If you still have problems, try dialling again, or try a different number; sometimes you will get a very bad line and it will not provide a strong enough signal for the modem to latch on to, especially if it is an acoustic type. Remember, too, that you cannot call a 300 bit/sec service with a 1200/75 bit/sec modem, or vice versa! Furthermore, American systems use different frequencies at 300 bits/sec from those used in Australia and Europe, so if you are buying a modem

```
Function: B,C,D,E,G,H,K,N,P,Q,R,S,T,V,W,X,#
(or ? if not known)??
                  ==>   MAJOR FUNCTIONS    <==
E Enter message         Q Quick summary          G Good bye
R Retrieve msg          H HELP < ==              S Summarize msgs

J                 ==>   MINOR FUNCTIONS    <==
B Bulletin reprint      T Print time & date      C Case upper/lower
V Video backspace       D Duplex: echo off       W Reprint welcome
K Kill message          X Expert user mode       N Nulls: How many?
# Print caller # etc    P Prompt bell off

J==> For details, type H, press CR, then type command letter

J                 ==>   WHOLE WORD COMMANDS    <==
USER     List of users and topics they are interested in
NEWS     What's new on CBBS
SHORT    Shorten output: no duplicate spaces, etc
HELP     New user help: (H is keyword based help)
CHAT     Chat on-line with system operator
JOKES    Print latest CBBS joke file
QUIT or BYE      Exit CBBS
CONT     Continue last message entered
```

Fig 3 Main Command Menu on MICOM's CBBS.

```
            *** Welcome to MICOM's CBBS(R) ***
        *** Computerised Bulletin Board System (R) ***
    *** Operated by the  Microcomputer Club of Melbourne ***
            *** P.O. Box 60.  Canterbury, 3126 ***
            *** In operation since October '82 ***

MICOM's CBBS requires an access password.
Non-MICOM members can press "return" for visitor's access.

Password =
You have been granted visitor status.

Y/N: Is this your first time on this CBBS?N
What is your FIRST name?STEVE
(Press return to go back to "first name" question)
What is your LAST name?WITHERS

Logging name to disk...
You are caller  9983, next msg = 04292.   202 active messages.

MICOM takes no responsibility for the content of any message
left on this CBBS. MICOM reserves the right to erase or edit
any message that it considers unsuitable as soon as MICOM
becomes aware of the presence of such a message.  MICOM also
reserves the right to deny CBBS access to any person or
persons.
```

Fig 4 Extracts from Welcome message on MICOM's CBBS.

of American origin, make sure that it is set to CCITT V21 tones, and not Bell standards or you will not be able to use it for the majority of Australian or European systems.

If all is well at this stage, you should see something appearing on your screen. If not, hit 'enter' or 'return' a couple of times. If you get something, but it makes no sense, the usual reason is either that you've got a very bad line, which is not too common, or your RS232 settings are not compatible with the system you are calling (see Fig 2). What you should see is some sort of welcoming message, normally followed by a request to enter the password (apparently Telecom require that access is limited to "common interest groups", although BBSs often make provision for "visitors") and your name (Fig 4). After doing this you will probably be asked a few technical questions about your computer's screen width, line feeds and nulls. The first is obvious. The nulls question just refers to the amount of time the system will pause after sending a carriage return before starting a new line. This is most important for printer type terminals as the head has to have time to return to the start of the line. If you're not sure start with 5 for a video display and somewhere around 20 for a printer type. You can always alter these later if they are not quite suitable.

The other question you will be asked is whether you need line feeds to be sent with carriage returns. If you're not sure answer 'yes'; again, you will be able to change it if the lines on your screen are double spaced. Some systems will only ask you these questions on your first call, remembering you after that, but there will be a means of changing these parameters in the system somewhere, should you wish to do so. However, you may get 'forgotten' if you don't call the system for some time, and as a result will have to answer the questions all over again.

Eventually, you will come to the main menu — see Fig 3 — perhaps after an introductory news bulletin, and this is the heart of the system. You are now on your own and 'flying solo'. The way to get to know the system is simply to explore the various menu commands. Most will lead to sub-menus, and things may seem a bit complex at first, but you will soon get the hang of it.

One thing I would encourage you to do is to contribute to the BBS when you call. Don't just look around and go away again, leave a message, or better still, messages. Everyone has something they can pass on whether it be a tip about their own micro, a question, or just plain gossip! Messages are what make the system interesting for other callers (on Peter's BBS a poll showed that this was the feature that 70% of callers liked best). As we keep telling people, more messages mean more interest, and more interest means more callers, and more callers means more messages . . .

Happy communicating!

BLUDNERS

More bugs have been found in 'Domain of the Djinn' (August Programs). As mentioned in the October issue, the fourth RND statement in line 6000 should have 7 as its expression rather than 8. Also, towards the end of line 945, '. . . AND EH="E" . . .' should read '. . . AND EH="J" . . .'. Finally, in line 948 '. . (G(U,2)/3 . . .' should read '. . . (G(U,1)/3 . . .'.

We omitted to mention in the Checkout of T/Maker III that the product is also available from Alftron Pty Ltd on (03) 758 9000 for $354 who import it directly from the author, Peter Roizen.

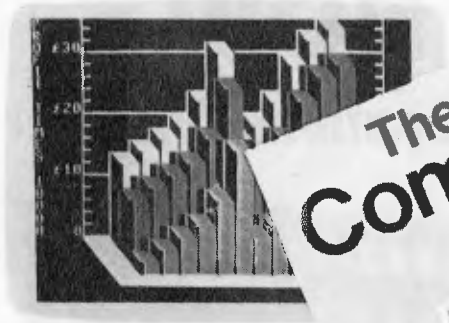
NIGHT & DAY.

Magmedia gives you the best of both worlds.
To keep our customers happy we have to offer a balanced range of the best computer products on the market.
To maintain balance the universe offers us night & day.
For the same reason Magmedia offers you Xidex and Datalife® flexible disks.
Take your pick from the best in the world.

magmedia
supplies and accessories for your computer

Sydney (02) 428 1100 Melbourne (03) 699 9688 Brisbane (07) 229 1600 Canberra (062) 47 2322 Perth (09) 328 3311 Adelaide (08) 223 6261

THE WORKING COMMODORE 64



The Working Commodore 64

David Lawrence

A LIBRARY OF PRACTICAL SUBROUTINES & PROGRAMS

Some of the more advanced programs include a word processor and text editor, a music and sound synthesiser program, a sprite editor and a program which allows the user to enter high resolution graphics mode. This is not available in the standard Basic.

Each of the programs is explained in detail, line by line. And each of the programs is built up out of general purpose subroutines and modules which, once understood, can form the basis of any other programs you need to write.

$19.95
plus postage & packaging

Abacus Software

SKIER-64 is an arcade-style game written entirely in machine language for fast, smooth action. It tests your reflexes as you control the skier. The goal is to arrive at the bottom of a Slalom, Giant Slalom or Alps run in one piece in the shortest possible time. The fastest time for each course is saved as long as the computer remains on.

REQUIREMENTS:
Commodore 64
Disk drive or Dattasette
TV or monitor
Optional: Joystick (port 1 or 2)

$25.50 disk
tape $21.00
plus p & p

MAJOR PRICE BREAKTHROUGH

"IMPACT PRINTER"
For use with VIC-20 and C-64

$199
+ FREIGHT

No additional hardware needed. Connects directly to VIC-20 and C-64 Serial Bus. The "IMPACT PRINTER" uses standard adding machine paper roll available most anywhere.

USES: Program listings, screen copy, reports, mailing lists, graphics, etc.

FEATURES: Cartridge ribbon, uses standard 2.25" (5.5cm) wide plain paper roll, 24, 32 and 40 column width capability upon user command, upper/lower case characters, graphic character set, dot addressible graphics, reverse character mode, permits user selection of two character sets.

SPECIFICATIONS: Print Method–Impact dot matrix • Print rate–30 characters per second • Print format–144 dots per line • Character Size–(5 x 7 dot matrix) 0.066" W x 0.09"H (24 column) • Paper–2.25" (5.5cm) W normal paper roll • Ribbon–Ribbon cartridge • Color–Single Color (depends on ribbon used) • Manual Controls–Power on/off; paper feed • Indicators–Power on LED • Reliability–MCBF equal to 500,00 lines • Power–1 watt (idle), 4 watts (while printing) • Dimensions–4"W x 4.5"L x 2"H (10cm x 11.5cm x 5cm) • Transformer included

THE VIC CENTRE

416 Logan Road,
Stones Corner Brisbane
P.O. Box 274
Sunnybank Q'ld. 4109
Australia
Tel.: (07) 397 0888
Telex: AA40811

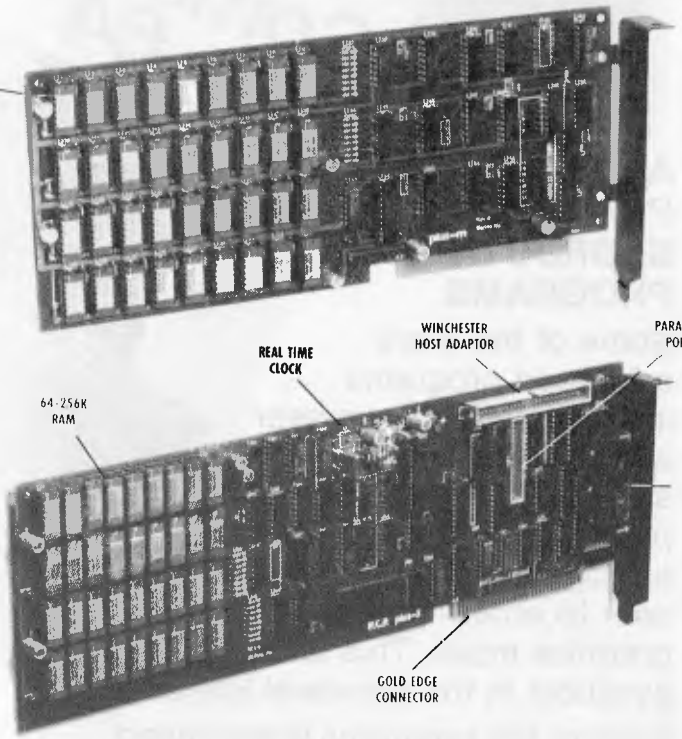
A division of CW Electronics

Prices and specifications subject to change without notice.

AVAILABLE NOW

For the IBM P.C. or IBM P.C. Compatible Computer

THE PLUS™ SERIES
64K — 256K RAM



The PLUS-M™
64K — 256K
EXPANDABLE MEMORY CARD

$349* with 64K installed

The PLUS-S™
64K — 256K memory expansion
Parallel Printer Port
RS232 Port
Real Time Clock
Winchester Host Adaptor

$649* with 64K installed

* 180 DAY WARRANTY
* FULLY IBM COMPATIBLE
* FULLY AUSTRALIAN DESIGNED AND MANUFACTURED
* FREE DELIVERY AUSTRALIA WIDE

OTHER PLUS PRODUCTS

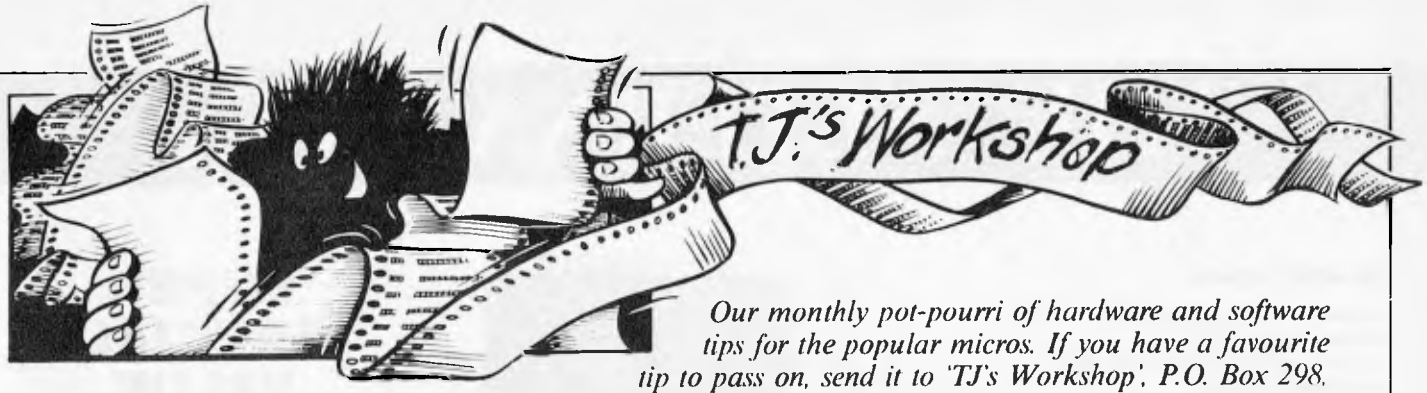
PLUS—W	— 5 MEG WINCHESTER SYSTEM	— $2995.00*
PLUS 64K	— 64K MEMORY EXPANSION	— $120.00*
PLUS—COPY	— COPY PROTECTED SOFTWARE	— $49.95
PLUS—RAMDSK	— RAMDISK PROGRAM	— $49.95

* Plus Sales Tax if applicable

DEALER ENQUIRIES WELCOME

Available direct from:

PERSONAL COMPUTER PERIPHERALS
279 JUNCTION ROAD, CLAYFIELD, BRISBANE 4011
Telephone: (07) 57 9881



Our monthly pot-pourri of hardware and software tips for the popular micros. If you have a favourite tip to pass on, send it to 'TJ's Workshop', P.O. Box 298, Clayton, Vic. 3168. Please keep your contributions as concise as possible. We will pay $10—$30 for any tips we publish. APC can accept no responsibility for any damage caused by using these tips, and readers should be advised that any hardware modifications may render the maker's guarantee invalid.

CBM 64 magic writing

All Commodore machines employ a special technique for the entry of data through the keyboard. A knowledge of how this works allows a flexible system of data entry to be implemented.

Every 1/60th of a second the machine stops what it is doing to look at the keyboard, to see if a key has been pressed since the last check. It stores any key found on the top of the keyboard stack and whenever the machine is in direct mode, the computer will empty the stack to the system. This results in 'magic writing' seen if you type in something while the computer is listing a program. What happens is quite simple — while the program is being listed and you press a key, the corresponding character is pushed onto the stack. This stack or buffer is ordered in a first in first out system (FIFO). The same effect is also noticeable when a program halts in a get loop, waiting for a key to be pressed. The user may have accidentally pressed a key, which goes onto the stack and the program ploughs on taking this key as the input.

The buffer has a capacity of ten characters and the key to this problem is to empty it before requesting data input by getting ten pieces of dummy data e.g.

```
1000 REM EMPTY
   BUFFER'
1010 FOR A=1 TO 10:
   GET A$: NEXT A
1020 REM NOW REQUEST
   INPUT
```

A simpler and more elegant way of doing this is to tell the machine that there is no data in the buffer by POKEing the pointer with a zero e.g. POKE 198,0

If you are simply interested in whether a key is being pressed at the moment then use PEEK(197), which returns a unique value for each key pressed.

The buffer itself starts at 631 and goes on to 640. It is possible to put characters into the buffer and tell the pointer how many are there. If the program is then stopped these keys will be interpreted in direct mode. Printing lines on the screen such as:

```
GOTO 100
```

and then putting the current cursor position at the beginning of the line, and then put a character 13 (carriage return) into the buffer then STOP the program. This will cause the GOTO to be interpreted as a direct command. Using this method it is possible to make programs that are able to alter themselves. Note:
197 holds the value of the key depressed at moment of request.
198 holds value or buffer pointer (zero is empty)
631-640 keyboard buffer
649 holds the physical buffer size.

Paul Roper

TRS-80 computed RESTORE

I have written a Basic subroutine to "RESTORE" to a specified line number. To use it, set X to the line number to which you wish to RESTORE, and call the routine with GOSUB 35000.

If you use a non-existent line number, the routine will give the message "NO SUCH LINE".

```
35000X1=INT(X/256):
      X2=X—X1
      *256:PR=17129
35010LN=PEEK(PR+2)
      +256*PEEK(PR+3):
      IFLN>X THEN
      PRINT "NO
      SUCH LINE.":
      RETURN
35020IFLN<X THEN
      PR=PEEK(PR+1)*
      256+PEEK
      (PR):GOTO 35010
35030PR=PR — 1:POKE
      16640, INT(PR/256):
      POKE 16639,
      PR=256*PEEK
      (16640)
35040RETURN
```

I hope this will be useful to TRS-80/System 80 users translating from machines with the RESTORE X facility.

Darrel Francis

Machine-level contact

The Apple p-system intentionally isolates the user from machine-level contacts. The philosophy of the p-system is to provide a machine-independent operating environment. Thus Apple Pascal has no PEEK, POKE or CALL statements. However, it is possible to separately assemble machine-language subroutines and link them into a Pascal host program (or to place them in the SYSTEM.LIBRARY, so that they are automatically linked in at compile time).

Listing 1 is a set of machine language routines which give PEEK, POKE and CALL functions. The fourth function LOC returns the absolute address in memory of its parameter.

Listing 2 is a Pascal program which illustrates how these functions are referenced from inside Pascal. They are each defined as EXTERNAL functions or procedures. Note that the LOC function's parameter must be call-by-name rather than call-by-value. The value of J may be changed by POKEing to the appropriate address. I and K are altered by POKEing to adjacent addresses (as I, J, K are declared consecutively in the program).

These functions may be used to directly reference addresses on peripheral cards, to POKE characters directly to the text screen

THE ALTERNATIVE:

Standard Features

- 6502 and Z80 microprocessors
- 64K RAM Expandable to 128K
- 2K System ROM, plus sockets for 10K
- additional user ROM
- RGB and Composite (NTSC or PAL) Video
- Selectable 80 or 40 Column Text display
- High Resolution Graphics: Six Colors, 280 x 192 or 280 x 160 with four lines of text
- Color Graphic Mode: 15 Colors 40 x 48 or 80 x 48; 40 x 40 or 80 x 40 with four lines of text
- 8 bit parallel output
- RS-232c Serial I/O
- Detached Keyboard: All standard keyboard functions, Upper/Lower case characters, Numeric Keypad, Cursor Control Block
- Six Apple II compatible slots for plug-in peripherals
- Game paddle I/O
- Built-in loudspeaker
- Mounting slots for up to three DN-25 I/O plugs
- CP/M 3.0

Hardware and Software compatible with Apple II

SUPER SPECIAL VALUE

$1550

TAX PAID

BASIS MEB FLY

PERIFERALS

Disk Drive slim line 163k 5¼" with controller	$380.00
Disk drive 8" 1.6 meg with controller	$1120.00
Twin disk drive 3.2 meg with controller.....	$1735.00
Hard disk 5 or 10 megabite also available	$1500-$2000

PRINTERS

Brother HR15 daisy wheel printer with cable	$745.00
C Itoh 1550 prowriter 140cps 15" paper	$1150.00
Cp80 dp80 or xp80 dot matrix all one price	$420.00

SOFTWARE
APPLE SOFTWARE COMPATIBLE
CPM 2.2 BUSINESS SOFTWARE

SOFTWARE SPECIALS
FULL ACCOUNTS
GENERAL LEDGER
ACCOUNTS PAYABLE
INVENTORY
ACCOUNTS RECEIVABLE

$500

TAX PAID

TELEPHONE 03 568-6911

MICRO PRO COMPUTERS
43 ATHERTON RD
OAKLEIGH 3166
MELBOURNE AUST

PLEASE FIND ENCLOSED CHEQUE

FOR THE AMOUNT OF $.....

FOR THE FOLLOWING.....

.....

.....

PLEASE SEND ME MORE INFORMATION

NAME.....

ADDRESS.....

SUBURB.....

STATE.....

T.J.'s Workshop

(thus making available flashing and inverse characters, which are impossible to get directly from Pascal) or to throw 'soft switches', e.g. every second PEEK(-16336) gives a 'click' from the loudspeaker, PEEK(-16301) gives a mixed text and graphics screen (which is available from Apple Basic, but not normally available from Apple Pascal), etc.

G Nagels

```
        .MACRO POP
        PLA
        STA %1
        PLA
        STA %1+1
        .ENDM
        .MACRO PUSH
        LDA %1+1
        PHA
        LDA %1
        PHA
        .ENDM
RETURN  .EQU 0
ADDR    .EQU 2
VAL     .EQU 4
        .FUNC PEEK,1
        POP RETURN          ;STORE RETURN ADDRESS
        PLA                 ;DISCARD ZEROS
        PLA                 ;   "       "
        PLA                 ;   "       "
        PLA                 ;   "       "
        POP ADDR
        LDY #0
        TYA
        PHA                 ;MSB=0
        LDA @ADDR,Y         ;FIND VALUE IN (ADDR)
        PHA                 ;PUSH VALUE ONTO STACK
        PUSH RETURN         ;RESTORE RETURN ADDRESS
        RTS
        .PROC POKE,2
        POP RETURN          ;STORE RETURN ADDRESS
        POP VAL             ;STORE POKED VALUE
        POP ADDR            ;STORE ADDRESS
        LDA VAL             ;LSB OF VALUE
        LDY #0
        STA @ADDR,Y         ;POKE LSB
        PUSH RETURN         ;RESTORE RETURN ADDRESS
        RTS
        .PROC CALL,1
        POP RETURN          ;STORE RETURN ADDRESS
        POP ADDR            ;STORE ADDRESS OF SUBROUTINE
        BEQ CONT            ;"ADDR" MUST POINT
        DEC ADDR+1          ;TO ADDRESS PRECEDING
CONT    DEC ADDR            ;CALLED SUBROUTINE
        PUSH RETURN         ;  SEND BACK TO PASCAL
        PUSH ADDR           ;  AFTER EXECUTING CALL
        RTS                 ;DO THE "CALL"
        .FUNC LOC,1         ;RETURNS ADDRESS OF PARAMETER
        POP RETURN          ;STORE RETURN ADDRESS
        PLA                 ;DISCARD ZEROS
        PLA                 ;   (LEAVING ADDRESS
        PLA                 ;    OF PARAMETER ON
        PLA                 ;    TOP OF THE STACK)
        PUSH RETURN         ;RESTORE RETURN ADDRESS
        RTS
        .END
```

Listing 1

```
PROGRAM PEPO;
VAR COM:CHAR;
I,J,K,ADDR,VAL:INTEGER;
FUNCTION PEEK(ADDR:INTEGER):INTEGER;EXTERNAL;
PROCEDURE POKE(ADDR,VAL:INTEGER);EXTERNAL;
PROCEDURE CALL(ADDR:INTEGER);EXTERNAL;
FUNCTION LOC(VAR VBLE:INTEGER):INTEGER;EXTERNAL;
BEGIN
```


PRESENTING — EASY DESK

THE LOW COST MOBILE COMPUTER DESK

A quality product at a price you can afford

★ Made in AUSTRALIA ★ Easy assembly

★ For use in the home, office, at work or in the class room. (IDEAL GIFT!!)

- ★ Packed in cardboard box
- ★ Laminated in teak
- ★ Sturdy steel construction
- ★ Solid castors
- ★ Courier delivers to your door
- ★ Dealers' enquiries welcome
- ★ Cheques,
- ★ Bankcard
- ★ Money orders, payable to:

$99 Tax Paid

HOME COMPUTERS

160 MAIN ROAD (BURWOOD HWY) UPPER FERNTREE GULLY 3156 Telephone: 758 2124

Name .....
Address .....
..... State ..... Postcode .....
Bankcard ..... Signature .....
☐ Cheque enclosed ☐ Bankcard

BASF

Introducing a totally new level of excellence in magnetic media — the "qualimetric" standard. The "qualimetric" standard is maintained without compromise through every step of BASF design, production, inspection, and testing . . . reflecting an unwavering BASF commitment to media fidelity and durability.

For information security, tomorrow and beyond, look for the distinctive BASF package with the "qualimetric" seal.

Introductory offer:

Box of 10 Flexydisks 5.25, single side, in de Luxe library case for **$38.50**

Free delivery anywhere in Australia

Comprehensive range in diskettes and computer tapes

PERIMEDIA PTY LTD
357 Nicholson Street, Carlton North 3054
Ph: (03) 347 7416

Fill out coupon and return with cheque to Perimedia Pty Ltd, 357 Nicholson Street, Carlton North 3054

Company Name .....
Address .....
.....
Phone .....
☐ boxes of BASF Flexydisks 5.25 s/s

ENTERCOM COMPUTER CO

136 Bridge Rd Richmond Vic 3121
(03) 429 5883 (03) 428 5714

C64 SPECIAL PACKAGE DEAL

COMMODORE 64

1 COMMODORE-64 COMPUTER
1 DATASETTE RECORDER
1 INTRO. TO BASIC PART 1
1 PROGRAMMERS REF. GUIDE
1 RECREATIONAL CARTRDIGE
1 JOYSTICK (SPECTRAVISION)
2 BLANK TAPES

ALL THIS FOR

$599.00

NORMALLY — $700

ALSO WIDE RANGE OF PERIPHERALS & SOFTWARE

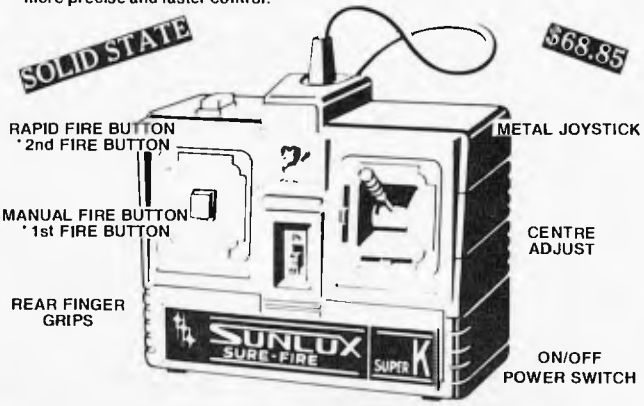
COMMODORE COLOUR MONITOR AVAILABLE **$429** **normally $449**

LION ELECTRONICS PRESENTS.....

THE ULTIMATE JOYSTICK

FOR COMMODORE, ATARI, ETC. & APPLE.

Held in two hands & operated as in a remote control system for models, you get more precise and faster control.



FEATURES:
1. Rapid Fire Button automatically fires 4 shots a second when depressed.
2. Manual Fire Button
3. Metal Joy Stick with adjustable length to suit your thumb.
4. Solid State output to computer.
5. No switches to break in the joystick movement.
6. Centre adjust on joystick - you can pre-set the stick to centre/left/right/up/down to suit your game.
7. Two handed control.
8. Virtually unbreakable as the joystick is operated by your thumb.
9. More precise and faster operation.

*DENOTES APPLE VERSION.

TRADE ENQUIRIES WELCOME

MAIL ORDERS: Send name, address, and cheque, etc. to:

LION ELECTRONICS, 314 Gt. Eastern Hwy, Midland 6056 Western Australia

T.J.'s Workshop

```
  WRITELN('J IS AT ADDRESS ',LOC(J));
  REPEAT
    WRITELN('PEEK (E),POKE (O),CALL (C) OR QUIT (Q)?');
    READ(COM);WRITELN;
    CASE COM OF
      'E':BEGIN WRITE('ADDRESS = ');READLN(ADDR);
            WRITELN('VALUE = ',PEEK(ADDR));END;
      'O':BEGIN WRITE('ADDRESS = ');READLN(ADDR);
            WRITE('VALUE = ');READLN(VAL);POKE(ADDR,VAL);END;
      'C':BEGIN WRITE('START ADDRESS = ');
            READLN(ADDR);CALL(ADDR);END;
    END;
    WRITELN(I,' ',J,' ',K);
  UNTIL COM='Q';
END.
```

Listing 2

Programming sound on the VIC 20

This program is written for the VIC 20. The program is in machine code and locates itself at 02A1 hex or 673 decimal. The program will run on any VIC with any memory configuration.

The program is designed to be an aid for programming sound. After running type: SYS 673,S1,S2,S3,S4, VL

Where:	S1=Bass voice	— Limits 127-255
	S2=Tenor voice	— Limits 127-255
	S3=Treble voice	— Limits 127-255
	S4=Noise generator	— Limits 127-255
	VL=Volume control	— Limits 000-015

Steven Jones

```
10 DATA 32,253,206,32,138,215,138,72,32,253
20 DATA 206,32,138,215,138,72,32,253,206,32
30 DATA 138,215,138,72,32,253,206,32,138
40 DATA 215,138,72,32,253,206,32,138,215
50 DATA 138,201,21,16,20,141,14,144,104
60 DATA 141,13,144,104,141,12,144,104,141
70 DATA 11,144,104,141,10,144,96,169,21
80 DATA 141,15,144,96,0,0,0,0
90 FORI=673TO745:READA:POKEI,A:NEXT
```

VIC ON ERROR GOTO

VIC Basic has been criticised for not having many advanced features. There is one useful feature, however, that can be quite easily duplicated on a VIC without having to recourse to machine code.

This short subroutine reproduces the 'ON ERROR GOTO' command in quite a novel way.

```
100 A$="GOTO"+STR$
(EL)+CHR$(13)
110L=LEN(A$):POKE 198,L
120FORA=1 TOL:POKE
630+A,ASC
(MID$(A$,A)):NEXTA
130RETURN
```

The subroutine uses the fact that the VIC has a ten character keyboard buffer (locations 631-640) into which data can be typed while a program is running. If program execution is halted by an error, the

contents of the buffer are then printed on the screen and executed. The subroutine simply POKEs data into the buffer for when an error is encountered.

To use the subroutine, use the following:
EL=nn:GOSUB 100
where nn is the number of the line to be jumped to when an error occurs.

E Butler

Commodore Basic in the NEWed

The following machine code subroutine for theCBM64 will retrieve a Basic program once it has been NEWed.

To use it, type in the Basic program and RUN it, clear the memory by typing NEW.

Now whenever you want to OLD a program you just enter SYS 53200.

This subroutine will not work if, after NEWing the program, you enter a line of Basic or define a variable.

```
10 DATA 169,1,141,2,8,32,
   51,165,165,34,24,105
20 DATA 2,133,45,165,35,
   105,0,133,46,76,94,166
30 FOR I=53200 TO 53223:
   READ A: POKE I,A:
   NEXT I
```

Impractical tip but useful technique

While experimenting with the filespec after the enter command on my Atari 800, I discovered that a filespec of K i.e. ENTER"K:" allowed me to enter data directly into memory, without having it displayed on the VDU (the filespec K bypasses the editor).

So far I can think of no practical use for this, but the technique can be applied to the input command with great benefit.

```
10 DIM A$ (10)
20 OPEN #1,4,0,"K:"
30 INPUT #1,A$
```

When the above program is run, on reaching line 30, you can INPUT directly from the keyboard into A$, with nothing appearing on the screen. This could be useful for entering log on codes, or any security lock you may have in your program.

Mr B.

The 64 disabled . . .

The following POKEs are very useful when used on the Commodore 64. POKE 808,225 disables the RUN/STOP-RESTORE sequence. POKE 808,235 re-enables it. To stop any keys repeating POKE 650,64. To make all keys repeat POKE 650,128 and to just let the cursor keys, INSTL/DEL key and space repeat, POKE 650,0.

Paul Griffith

. . . and invisible

Invisibility will protect your brainwaves on the Commodore 64!

Any line of less than 35 characters can be made to disappear from a listing. To achieve this, type in:
:REM" "
at the end of the line you wish to conceal. Then delete the second quotation mark and press the Shift and INST/DEL keys forty times, followed by the DEL key

NEW MODEL!

CICADA 300T
DATA MODEM
WITH INTEGRATED TELEPHONE

For user installation to a standard phone socket without Telecom assistance, the new **Cicada 300T 300-Baud data modem** features fully integrated phone for maximum convenience. With all the legendary performance and reliability of the standard Cicada 300.

Or, buy the continuously improved standard Cicada 300 for use with your own telephone. Now operated by hundreds of government, business and private users, the Cicada series modems carry a full, meaningful warranty.

Specifications (Both modems): Compact answer-and-originate units for direct connection to phone lines and for computer interface utilising either RS232C or V24/28 systems. Unit measures 203mm x 152mm x 63.5mm. Telecom approval number C83/37/1011.

Available now from Centre Industries or leading retailers.

CENTRE INDUSTRIES
ELECTRONICS & TELECOMMUNICATIONS EXPERTISE

187 Allambie Road, Allambie Heights, NSW 2100
Telephone (02) 451 5555 After Hours (02) 451 6244
Telex AA 22671

FMS SOFTWARE AND HARDWARE FOR CP/M BASED SYSTEMS

Agent for: Lifeboat Associates, Sigma International, Compuview, Westico, Memtech, Anderson Digital Equipment, AWA, Televideo, Discovery.

NEW — 16-Bit Software Available for the IBM PC, plus . . .

System Tools:
Emulator/86 (the CP/M emulator)
EM80/86
PMATE 86
UT86

Mailing List Systems:
Postmaster

Telecommunications:
ASCDM

Languages:
Lattice C Compiler

Numerical Problem-Solving Tools:

DataBase Management Systems:
T.I.M. III

Word Processing Systems and Aids:
Wordstar
Mailmerge
Microspell
Spellguard

Disk Operating Systems:
MS-DOS — soon available configured for CompuPro Sweet 17 and Software Development System. Currently available for DEM license.

Media & Formats:
IBM Personal Computer . . . G1
GodBout . . . E1
Seattle . . . E1
TecMar . . . E1
Victor 9000 . . . G3
Sirius . . . G3

8-Bit Software Available

System Tools:
BUG and uBUG
DESPDDL
DISILDG
DISTEL
EDIT
EDIT-80
FILETRAN
IBM/CPM
MAC
MACRD-80
MINCE
PANEL
PASM
PLINK
PLINK II
PMATE
RAID
Reclaim
SID
TRS-80 Model II Cust Disk Unlock
WordMaster
XASM 05. 09. 18. 48. 51. 65. 67. F8. 400
ZAP80
ZDT
Z80 Development Package
ZSID

Telecommunications:
ASCOM
BSTAM
BSTMS
MicroLink 80
RBTE

Languages:
ALGDL-60
APL/V80
BASIC Compiler
BASIC-80
Precision BASIC
BD Software C Compiler
CBASIC-2
CIS CDBDL (Standard)
CIS CDBDL (Compact)
CDBDL-80
Fortran-80
KBASIC
muLISP/mySTAR-80
Nevada CDBDL
JRT Pascal
Pascal/M
Pascal/MT
Pascal/M+
Pascal/Z
PL/I-80
STIFF UPPER LISP
S-BASIC
Timin's Forth
Tiny-C
Tiny-C Two
UCSD Pascal
Whitesmith's C Compiler
XYBASIC

Disk Operating Systems:
Software BUS Family
SB-80
CP/M-80
MP/M

Language and Application Tools:
BASIC Utility Disk
DataStar
FABS
FABS II
Forms 1 for CIS CDBDL
Forms 2 for CIS COBOL
MAGSAM III
MAGSAM IV
MAGSDRT
M/SDRT for CDBDL 80
Programmer's Apprentice
PSDRT
QSDRT
STRING/80
STRING BIT
SUPERSDRT
ULTRASDRT II
VISAM

Word Processing Systems and Aids:
Benchmark
DocuMate/Plus
MicroSpell
Letterright
Magic Wand
Spellguard
TEX
Textwriter III
Wordindex
WordStar
WordStar Customization Notes

Data Management Systems:
CDNDDR
Formula
HDBS
Hoe
Microseed
MDBS
MDBS DRS QRS RTL
dBASE II
PRISM/LMS
PRISM/IMS
PRISM/ADS
T.I.M. III

General Purpose Applications:
CBS
CBS Label Option
Selector III-C2
Selector IV

Mailing List Systems:
Benchmark Mailing List
Postmaster
Mailing Address
MailMerge for WordStar
NAD

Numerical Problem-Solving Tools:
T/MAKER II
fpl
PRAN80
Analyst
Microstar
muSIMP/muMATH
Statpak

Professional and Office Aids:
Angel
American Software Property Management Package
Cornwall Apartment Menagment
Datebook
GrafTalk
Guardian
Professional Time Accounting
Property Management
Sales Pro
Torricelli Author
Wiremaster
Univair 9000 Series Legal Time Accounting

Media & Formats
The list of available formats is subject to change without notice. If you do not see your computer listed or are uncertain, call to confirm the format code for any particular equipment.

AES SUPER PLUS IV M4
ADDS Multivision. . . . .RT
ALSPA Bin A1
Altair 8800 . . . .B1
Altos A1
Apple CP/M 13 Sector . . . .RG
Apple CP/M 16 Sector . . . .RR
Archives 1 . . . .SG
AVL Eagle I . . . .RB
AVL Eagle II . . . .ST
BASF System 7100. . . . .RD
Blackhawk Micropolis Mod II . Q2
BMC IF-800 . . . .SR
California Computer Sys 8in. . A1
CDS Versatile 3B Q1
CDS Versatile 4 . . . .Q2
Columbia Data Products 8in. . A1
Columbia Data Products 5 26inS4
Compal 80. . . . .Q2
Commodore CBM/PET w/SSE Box + 8050 . . . .C2
Commodore CBM/PET w/Maddison Z-RAM + 8050C4
Compal 80. . . . .Q2
Computer Dps N C HQ. S2
Control Data 110 . . . .A1
CPT 8000 . . . .A1
Cromemco System 3 . . . .A1
Cromemco System 2 SD/SS . . R6
Cromemco System 2 DD/SS. .RX
Cromemco System 2 DD/DS .RY
CSSN Backup T1
Datapoint 1560/2150 . . . .A1
Datapoint 1550/2150 DD/SS .AA
Datapoint 1560/2150 DD/DS .AB
Datavue DU80-222 5.25in. . .M7
DECVI 18 X
Delta Systems A1
Digi-Log Microterm II . . . .RD
Digi-Log System 2000 . . . .RD
Digi-Log System 1000 . . . .RD
Digi-Log System 1500 . . . .RD
Direct DA1000 . . . .M2
DTC Micro 210A . . . .SC
Durango F-85 . . . .RL
Dynabyte DB8/2 . . . .R1
Dynabyte DB8/4 . . . .A1
Exidy Sorcerer + Exidy CP/M 80 8in A1
Exidy Sorcerer + Lifeboat CP/M 80 5.25 in .RW
EXD A1
Exxon 510. . . . .M5
Exxon 520. . . . .M5
Findex P6
Godbout (MS-DDS). E1
Heath H8 + H47. . . . .A1
Heath H89 + Magnolia CP/M 80 . . . .P7
Heath H89 + Heath CP/M 80 . P7
Helios II B2
Heurikon MLZ SS/DD . . . .SN
Heurikon MLZ DS/DD . . . .SD
Heuristics HCC Spectrum . . .A1
HP-87 5.25in S8
Hewlett-Packard 125 5.25in. . SB
Hewlett-Packard 125 8in. . . .A1
IBEX 7100. . . . .RQ
IBM Personal Computer G2
ICDM2411 Micro Floppy . . .R3
ICDM3712. . . . .A1
ICOM3812. . . . .A1
ICDM 4511 5440 Cartridge CP/M 80 V1.4 . . . . .D1
ICDM 4511 5440 Cartridge CP/M 80 V2.X. D2
ICL PC10 . . . .SD
IMS 5000 . . . .RA
IMSAI VDP-40 . . . .R4
IMSAI VDP-42 . . . .R4
IMSAI VDP-44 . . . .R5
IMSAI VDP-80 . . . .A1
Industrial Microsystems 5000 .RA
Industrial Microsystems A1
Intel IPDS DS/DD M6
Intel MDS SD/DD. A1
Intersil Develop System A1
Inter Systems Ithaca 800. . . .A1
Intertec Superbrain DDS0.1. . R7
Intertec Superbrain DOS0.5-2x RJ
Intertec Superbrain DDS 3x. .RK
Intertec Superbrain QD . . . .RS
ISC Intecolor 8063/8360/8963A1
Kaypro. S6
Lanier E 1 . . . .M3
Lanier Super + 4 (AES) M4
Lanier Super No problem (Lanier) M4
Lexitron VT1303 DSDD. . . .S6
Lexor Alphaprint Model S1. . S1
Lexor Lexoriter S1
Meca Delta 1 5.25in P6
MICDM2001. . . . .B3
MICOM2001E. B4
MICOM3003. . . . .M1
Micromation. A1
MicroMega 85 . . . .SC
Micropolis Mod I Q1
Micropolis Mod II. Q2
MITS 3200-3202 . . . .B1
Monroe OC 8820 DD/SS. . . .SW
Morrow Discus A1
Mostek A1
MSD 5.25in . . . .RC
MULTI-TECH-I Q2
MULTI-TECH-II Q2
Nascom (Gemini drives) R3
Nascom II with Lucas Drives . SL
National MSC 6600. . . . .A1
NCR81 40/9010 . . . .A1
NEC PC-8001 . . . .RV
Nicolet Logic Analyser Model 764 . . . .SX
NNC 80/80W A1
NNC 80 . . . .A1
North Star SD. P1
North Star DD. P2
North Star QD. P3
Northern Telecom 503 . . . .SM
Nylac Micropolis Mod II Q2
Dhio Scientific C3 . . . .A3
DKI IF-800 + MSA CP/M 80 . SP
DKI IF 800 + DKI/Lifeboat CP/M 80 . . . . .SR
(Above DKI entries replace catalog entry for OKI IF 800 format code RZ)
Dsborne 1 5.25in . . . .SA
Dtrona Attache . . . .MC
Pertec PCC 2000 . . . .A1
PET/CBM w/Small Systems Engineering Box + 8050 . . C2
PET/CBM w/Madison Z-RAM + 8050 . . . .C4
Philips MICDM 2001 8in. . . .B3
Philips MICDM 2001E B4
Philips MICOM 3003 . . . .M1
Philips P-2000 . . . .MA
Processor Technology Helios II B2
Quasar QDP100 . . . .A1
Quay 500 . . . .RD
Quay 520 . . . .RP
Quay 900 . . . .A1
RAIR SD. R9
RAIR DD . . . .RE
Research Machines 5.25in . . .RH
Research Machines 8in A1
Sanco 7000 5,25in . . . .RQ
Sanyo MBC 1000 . . . .SY
Sanyo MBC 2000 . . . .SS
Sanyo MBC 3000 . . . .A1
Seattle (16-bit) E1
SD Systems 5.25in R3
SD Systems 8in A1
Spacebyte A1
Tarbell 8in A1
TEI 5.25in R3
TEI 8in. A1
Televideo DD/DS Sys 1(801) . S5
Televideo DD/DS Sys 2 (806) . S6
Toshiba T200 5.25in . . . .SF
Toshiba T250 8in A1
Triumph Adler Alphatronic Model P2/64K . . . . .SV
TRS-80 Model I (Standerd Model) R2
TRS-80 I + FEC Freedom . . .RN
TRS-80 I + Omikron 5.25in . RM
TRS-80 Model I + Omikron 8in A1
TRS-80 Model I + Shuffleboard 8in A1
TRS-80 Model II A1
Vector MZ Q2
Vector Systen 2800. . . . .A1
Vector System B/VIP. Q2
Vista V089 5.25in SD . . . .RB
Vista V200 5.25in DD P6
Wangwriter. . . . .SE
WDRDPLEX. . . . .SZ
XERDX 820 5.25in. S6
XERDX 820 860 8in A1
ZEDA 580. . . . .SH
Zenith Z89 + Magnolia CP/M 80 . . . . .P7
Zenith Z89 + Zenith CP/M 80. P7
Zenith DD/SS . . . .SK
Zenith DD/DS . . . .SJ
Zilog MC22-20, 25, 50 . . . .A1

Wordstar training guides $30 each

Note that Lifeboat programs have specific hardware and memory requirements but will run on most CP/M machines with 48KByte available. SEND FOR FULL LIFE BOAT CATALOGUE $3.50.

FMS 95 CANTERBURY ROAD. MIDDLE PARK, VICTORIA 3206
Telephone: (03) 699 9899. Telex: AA 31604.

forty times. This will cause forty reverse field letter T's to appear.

Press the RETURN key to enter the line. When the program is listed, this line will be mysteriously absent.

The line is actually listed, but the screen editor is tricked into deleting it before it can be seen.

S Sassoon

ZX Spectrum bug

The program below for the ZX Spectrum shows another of the now famous but interesting bugs by which the machine is troubled.

```
10 IF INKEY$ <>""THEN
   GO    TO 10
20 IF INKEY$=""THEN
   GO TO 20
30 PRINT INKEY$:
40 GO TO 10
```

It is given in chapter 18 of the manual as a demonstration of the INKEY$ function. Run it, and then try pressing CAPS SHIFT-5 (cursor left) a few times and watch the interesting results. Some *very* strange things can happen to the listing especially if you try to alter or re-enter one of the affected lines. Is there any explanation of this?

Tim Hodges

Atari characters walking tall

The following short program enables the Atari to print out characters at normal width and double height. There is one drawback though, and that is the characters are not as clear as they are in modes 0, 1 and 2.

```
10DL=PEEK(560) + PEEK
  (561)★256+4
20FORI=1 TO 14:POKE DL
  + 1,5:NEXT I
30SETCOLOR1,8,12: SET
  COLOR2,8,12: SET
  COLOR 4,8,5: PRINT
  CHR$(125)
```

Steven Hurst

A swifter 64

Commodore 64 owners may like to try the following poke to speed Basic up:

```
POKE 53265,PEEK(53265)
  AND239
```

This blanks the screen to the border colour without destroying the contents of the screen (as in loading and saving). When blanked, Basic runs 5.5 per cent faster. The screen can be returned to normal with

```
POKE 53265,PEEK(53265)
  OR16
```

David Gristwood

Flashier Commodore

Owners of the Commodore 64 may find the following pokes useful for controlling the cursor.

POKE 204,0 before a GET will produce a flashing cursor, to switch off the cursor use POKE 204,1.

POKE 207,1 before an INPUT will switch off the cursor until a key is pressed.

A W Sheppard

COMPUTER AIDED DESIGN

ENTERCOM COMPUTER CO.

SIRIUS 1

A SOPHISTICATED DESIGN DRAFTING PACKAGE STRICTLY FOR PROFESSIONAL USE IN ENGINEERING, ARCHITECTURE & SCIENCE

FOR FURTHER INFORMATION AND DEMONSTRATIONS BY APPOINTMENT ONLY CONTACT:—

ENTERCOM COMPUTER CO.

136 BRIDGE ROAD, RICHMOND, VIC 3121
(03) 429-5883 (03) 428-5714

THE PERSISTENCE OF AN INTEGER

Mike Mudge muses mathematically

In the sequence 6788, 2688, 768, 336, 54, 20, 0, each term is the product of the decimal digits of the previous one: thus 6.7.8.8 = 2688.

The number of steps before a given integer collapses to a single digit (in the above example 6) is defined to be the *persistence* of that integer. (N Sloane, *Journal of Recreational Mathematics*, 6, 1973, pp 97-98).

The smallest integer with persistence n is denoted by y(n).

n	1	2	3	4	5	6
y(n)	10	25	39	77	679	6788

Notes:

(i) In binary (base 2) the maximum persistence is trivially 1, since only digits 0 or 1 may be present.

(ii) In base 3 (as used by the first generation of Russian digital computers) the second term is zero or a power of 2, since only digits 0,1 or 2 may be present.

There is a conjecture that all powers of 2 greater than the fifteenth contain a zero when written base 3: (this is certainly true up to 2^{500}) this conjecture implies that the maximum persistence in base 3 is 3.

(iii) Sloane has conjectured that in base b there is a number, which he denotes by c(b), such that the persistence cannot exceed c(b).

(iv) Erdös has considered theoretically the case where one forms the product of the *non-zero* digits and asks how fast one reaches a single digit and for which numbers the descent is slowest.

Problem

Submit a program, or suite of programs, to investigate some of the following:

(a) To compute y(n) for n = 7,8, ... 11.

(b) To attempt to find y(12), it is known to be greater than 10^{50}.)as are y(n) for all n greater than 11.)

(c) To investigate the expansion of 2^m base 3 for m significantly greater than 500. See note (ii) above.

(d) To investigate the persistence of an integer in bases greater than 3, within the context of note (iii) above.

(e) To construct empirical evidence relating to the work of Erdös, note (iv), above, where any zero digits are excluded from the product.

All submissions should include program listings, hardware descriptions, run times and output; they will be judged for accuracy, originality and efficiency (not necessarily in that order). A suitable prize will be awarded to the 'best' entry received.

Entries, to arrive by 31 January, 1984, to: Mr M R Mudge, C/- *APC*, P.O. Box 298, Clayton, Vic 3168.

U-sequences

Responses to this problem tended to concentrate on the fundamental U-sequence, ($u_1 = 1, u_2 = 2$), several reaching $u_{20000} = 268553$ and beyond.

The algorithms used for construction were the obvious ones and run times were often great. Readers interested in accessing these working programs are reminded that this is a genuine research problem, with no known 'correct answer', but I would hope to be able to put them in contact with other U-sequence enthusiasts.

However, a fundamental error in Muller's work or its subsequent interpretation has been revealed, in fact approximately 36.4% of the terms differ by 2 and not the 60% quoted. Frantic attempts are being made (M.M) to obtain sight of Muller's thesis from The State University Of New York at Buffalo, so that his algorithm can be studied: readers will be informed as soon as this has been achieved.

Interested readers are also referred to M C Wunderlich's, *The Improbable Behaviour of Ulam's Summation Sequence, in Computers and Number Theory*, Academic Press, 1971, pp 249-257, for further information.

Those correspondents writing in Basic and reaching typically $u_{220} = 2034$ in the fundamental sequence or as far as u_{100} in a range of related sequences resulting from somewhat arbitrary choice of u_1 and u_2 are not really in a position to add to the existing empirical evidence.

The choice of a prizewinner this month has proved difficult, but in the context of originality and dedication it is Mr P Fox using Forth with many assembler definitions who has stored the U-sequence as a difference table pending further investigation. He has incidentally two successive terms differing by more than 255.

ATARI HOME COMPUTERS

EDUCATIONAL PROGRAMMES
ARCADE TYPE GAMES
STRATEGY GAMES
MEMOREX DISKS
PROGRAMME CASSETTES
CASIO PERSONAL COMPUTERS
IMAGIC VIDEO GAMES FOR ATARI & INTELLIVISION

IT'S HERE AT LAST

ATARI 600XL 16K RAM
$399.00

Call and inspect our comprehensive range
All at competitive prices with personal service
BANKCARD, AMEX AND AGC FINANCE AVAILABLE

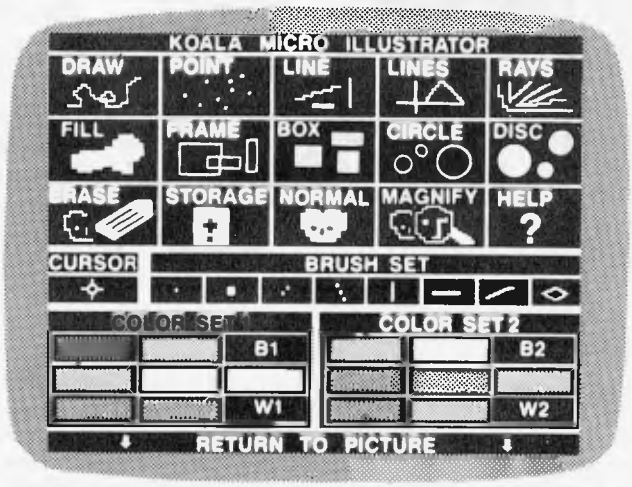
COMPUTER SENSATION
204 Toorak Road, South Yarra (03) 241 4367

Create computer graphics as fast as your imagination!

Want to draw a graph? Paint a landscape? Write musical notations? It's easy, because now you can create high resolution computer graphics in minutes with the KoalaPad™ Touch Tablet. It's a touch-sensitive, miniature control pad that lets you create full colour graphics with one finger. KoalaPad Touch Tablet is compatible with most games software too, so it's also a controller that's faster and more versatile than any joystick.

The KoalaPad Touch Tablet comes with the Micro Illustrator[1] program – a computer sketch pad that lets you touch select from a palette of geometric shapes and colours, or draw freeform with the Koala stylus, also included.

The KoalaPad Touch Tablet is available for the Atari® 400™ and 800™ Home Computers and the Atari 600XL™ and 800XL™ Supercomputers™, Commodore 64*, Vic-20*, Apple[2] and IBM[3] home computers. Ask for a demonstration at your computer stockist.



The KoalaPad Touch Tablet comes complete with the Micro Illustrator program, stylus, overlay and instruction manual.

KoalaPad™*

Touch Tablet distributed by Futuretronics Australia Pty. Ltd.

Victoria/Tasmania
(03) 579 2011.
New South Wales
(02) 517 2300.
N.S.W. Hamilton
(049) 69 6733.
Queensland
(07) 52 9633.
Western Australia
(09) 349 6111.
South Australia
(08) 297 5612

Futuretronics®

® & TM are trademarks of Atari, Inc. or Futuretronics Australia Pty. Ltd.
TM* KoalaPad is a trademark of Koala Technologies Corp.
1. Micro Illustrator is a trademark of Island Graphics, Inc. 2. Denotes a trademark of Apple Computers, Inc. 3. Denotes a trademark of IBM, Inc.
*Denotes a trademark of Commodore Electronics.

CONCORD/8699

APC SUBSET

Alan Tootill and David Barrow present more useful assembler language subroutines. This is your chance to build a library of general-purpose routines, documented to the standards we have developed together in this series. You can contribute a Datasheet, improve or develop one already printed or translate the implementation of a good idea from one processor to another. APC will pay for those contributions that achieve Datasheet status. Contributions (for any of the popular processors) should be sent to SUB SET, APC, P.O. Box 298, Clayton, Vic 3168.

Corrections

A rare author's slip: the machine code of the fifth instruction, JP P0,L4, in September's MSTRV should have been given as E2 YYYY and not E2 84 17, since the actual address in your machine depends on where you have located the routine.

Z80 string match

The need to match two strings arises in many different circumstances and produces interesting variations in how it is met in machine code. Our first Datasheet, COMPAR, from Peter Fox compares a string in memory with the string inserted in the code, following the CALL to COMPAR. Both strings are terminated by a zero (null) byte. Peter uses the routine in his editor/assembler to recognise commands.

Routines like this, with data inserted in the code, tend to be easy for the programmer to use and, as Chris Hood points out in another connection, can confound anyone trying to break the code from a hex dump, if they try to decode the inserted data. An interesting thought; though this series is not in the business of trying to confound anybody.

Note that DE, which points to the string in memory, is returned unchanged so that, if a match is not found, a different string can be easily tested for.

DATASHEET

```
;=COMPAR  - Free format string compare.
;/CLASS:  1
;/TIME CRITICAL?:  No
;/DESCRIPTION:  Compares string in memory pointed to by DE
;/              with string after the CALL to COMPAR.
;/ACTION:  Get HL pointing to string inserted in the code.
;/         Save DE and A.
;/         Compare characters of the two strings.
;/         If equal increment pointers and
;/         if characters not zero go back
;/         to compare next two characters.
;/         If characters zero, restore registers and return.
;/         If unequal, skip remaining characters of inserted
;/         string, clear zero flag, restore registers and return.
;/SUBr DEPENDENCE:  None
;/INTERFACES:  None
;/INPUT:  DE points to string in memory, terminated by null byte.
;/        The initial return address points to the string
;/        inserted in the code, terminated by a null byte.
;/OUTPUT:  If strings equal - Z flag is set.
;/                    Else - Z flag is reset.
;/         DE unchanged, Carry flag reset; returns to byte
;/         after zero byte of inserted string.
;/REGs USED:  F
;/STACK USE:  4
;/LENGTH:  25
;/PROCESSOR:  Z80

COMPAR:  EX     (SP),HL   ;HL to stack; ret adr to HL.   E3
         PUSH   DE        ;DE to stack;                  D5
         PUSH   AF        ;AF to stack.                  F5
L1:      LD     A,(DE)    ;compare characters            1A
         CP     (HL)      ;of the two strings.           BE
         JR     NZ,L3     ;jump if different.            20 0A
         INC    HL        ;same so point to next         23
         INC    DE        ;pair of characters.           13
         OR     A         ;was it the last pair?         B7
         JR     NZ,L1     ;do next pair if not.          20 F7
L2:      POP    DE        ;original AF to DE.            D1
         LD     A,D       ;original A to A.              7A
         POP    DE        ;original DE to DE.            D1
         EX     (SP)HL    ;OHL to HL;new ret to stack.   E3
         RET              ;return;                       C9
L3:      LD     A,(HL)    ;not equal so skip             7E
         INC    HL        ;string inserted in code,      23
         OR     A         ;until zero byte               B7
         JR     NZ,L3     ;passed.                       20 FB
         INC    A         ;to clear the zero flag.       3C
         JR     L2        ;restore registers & return.   18 F3
```

6502 string match

Datasheet MATCH, from Dennis May, is for matching a keyword string against a table of strings. The end of each string in the table is indicated by having bit 7 of its last character set and the end of the table is marked by a byte of FFH. Since a match is wanted if the keyword begins with a complete table string, no keyword length is given. For a strict match, the keyword string could be terminated by some non-ASCII-character byte such as 00H (null) or 0DH (carriage return).

The routine makes use of zero page RAM, 16 contiguous bytes of which, designated MO-MF and shown in the machine code as ZZ, are reserved by convention for Sub Set 6502 routines.

DATASHEET

```
;=MATCH - Keyword match routine.
;/CLASS:  2
;/TIME CRITICAL ? No
;/DESCRIPTION:  Looks up a keyword string in a match table.  If
;/              the keyword equals or begins with a complete
;/              table string, returns its position in the table.
;/              If keyword not in table, returns $FF in X register.
;/ACTION:  Sets position count to zero.  Subtracts characters in
          keyword from characters in table until difference found.
          If difference = $80 stores length-1 of keyword, moves
          pointer past keyword and loads position in table in X.
;/        Otherwise moves table pointer to next keyword and
;/        increments position counter.  If end of match table, sets
;/        X to $FF and returns else repeats subtracting characters.
;/SUBr DEPENDENCE:  None
```

WHEN IT COMES TO PERSONAL COMPUTER SPECTRAVIDEO™ IS BEYOND ANY COMPARE!

To the delight of our customers, and the dismay of our competitors, we now proudly present the most advanced, most capable personal computer system available today: Spectravideo™'s SV-318 and SV-328. While the SV-318 is "everything home computer users were waiting for," the SV-328 is specially designed "for the small business that doesn't plan to stay that way." These 2 computers, too, are beyond any comparison in their price range.

And they do not stand alone. Seldom, if every, has a new computer been supported by so many peripherals. Of exceptional quality, all this hardware rides into you on the crest of the very last technology.

Additionally — and importantly — Spectravideo™ is very software oriented. With built-in CP/M compatibility, the SV system allows you to take advantage of thousands of pre-existing programs. And with the MSX software compatible standard, jointly launched by Spectravideo™ and most of Japan's largest electronics firms, Spectravideo™ can take advantage of all software developed by other MSX participants. Plus, Spectravideo™ is now producing its own line of top-quality software. Finally, the SV system includes several innovative and interesting accessories that you will want to use.

Because of product depth and ease-of-operation, the SV system will give you full usage from the moment you unpack it. Yet it is both capable and expandable enough to give you long-term usage, too. That's why Spectravideo™ is truly, "The computer system you'll grow into, not out of."

MSX
software compatible standard

	SPECTRAVIDEO SV 328	SPECTRAVIDEO SV 318	APPLE II E	ATARI 800	COMMODORE 64	BBC MODEL B	DRAGON 32	SPECTRUM
COMPUTING POWER FEATURES								
BUILT-IN ROM	48K	32K	16K	10K	20K	16K	16K	16K
EXPANDABLE TO	96K	96K	N/A	42K	N/A	64K	N/A	N/A
BUILT-IN EXTENDED MICROSOFT® BASIC	YES	YES	YES	ADDITIONAL COST	NO	NO	YES	NO
BUILT-IN RAM	80K*	32K***	64K	48K	64K	32K	32K	16K
EXPANDABLE TO	256K**	256K**	64K	NO	N/A	32K	64K	48K
KEYBOARD FEATURES								
NUMBER OF KEYS	87	71	63	61	66	73	53	40
USER DEFINE FUNCTIONS	10	10	N/A	4	8	10	N/A	N/A
SPECIAL WORD PROCESSING	YES	YES	NO	NO	NO	NO	NO	NO
GENERATED GRAPHICS (FROM KEYBOARD)	YES	YES	NO	YES	YES	YES	YES	YES
UPPER/LOWER CASE	YES	YES	YES	YES	YES	YES	YES	YES
GAME/AUDIO FEATURES								
SEPARATE CARTRIDGE SLOTS	YES	YES	NO	YES	NO	NO	YES	NO
BUILT-IN JOYSTICK	NO	YES	NO	NO	NO	NO	NO	NO
COLORS	16	16	15	128	16	16	9	8
RESOLUTIDN (PIXELS)	256x192	256x192	280 x 160	320 x 192	320 x 200	256 x 640	256 x 192	256 x 192
SPRITES	32	32	N/A	4	8	N/A	16	N/A
SOUND CHANNELS	3	3	1	4	3	1	3	1
OCTAVES PER CHANNEL	8	8	4	4	9	3	5	3
A.D.S.R. ENVELOPE	YES	YES	NO	NO	YES	YES	NO	NO
PERIPHERAL SPECIFICATIONS								
CASSETTE	2 CHANNEL	2 CHANNEL	1 CHANNEL	2 CHANNEL	1 CHANNEL	2 CHANNEL	2 CHANNEL	1
AUDIO I/O	YES	YES	NO	YES	NO	NO	YES	NO
BUILT-IN MIC	YES	YES	NO	NO	NO	NO	NO	NO
DISK DRIVE CAPACITY (LOW PROFILE)	256K YES	256K YES	143K NO	92K NO	170K NO	100K NO	100K NO	100K NO
CP/M® COMPATIBILITY (Standard 80 column programs)								
CP/M® 2.2	YES	YES	NO****	NO	NO*****	YES	NO	NO
CP/M 3.0	YES	YES	NO	NO	NO	NO	NO	NO

Specifications are subject to change without prior notice.

* 64K user addressable plus 16K graphic support
** 240K user addressable plus 16K graphic support
*** 16K user addressable plus 16K graphic support
**** Apple II can accept modified 40 or 80 Column CP/M
***** Commodore 64 accepts 40 column CP/M

70 St. Kilda Road, St. Kilda, Vic. 3182. Ph: (03) 537-2000
P.O. Box 474, Edgecliffe, N.S.W. 2027. Ph: (02) 328-1190
Franklin Agencies, 3 Marie St., Milton, Qld. 4064. Ph: (07) 369-0496
Jerdon Agencies, 25 Gladstone St., E. Perth, W.A. 6000. Ph: (09) 328-5299
Dennington Enterprises, 46 Canning St., Launceston, Tas. 7250. Ph: (003) 31-8551

SPECTRAVIDEO™

MSX, Microsoft Extended BASIC is a trademark of Microsoft Corporation
CP/M is a trademark of Digital Research Inc.

SAD-83-004

© 1983 SPECTRAVIDEO INTERNATIONAL LTD.

```
;/INTERFACES:  None
;/INPUT:  M0,M1 contain address (1 ,hi) of keyword to be matched.
         M4,M5 contain address (1 ,hi) of match table.
;/       Match table can be located anywhere in RAM.  It can have
;/       up to 255 elements each up to 255 characters long.  The
;/       last character of each element must have bit 7 set.  The
;/       end of table is marked by a byte of $FF.
;/OUTPUT:  If match found: position in table of keyword returned in X,
;/            Length-1 of keyword in M3 and M0,M1 advanced past keyword
;/         If no match: X = $FF and M3,M0,M1 unchanged.
;/REGs USED:  A,X,Y,P,M0-M5.
;/STACK USE:  0
;/LENGTH:  61
;/PROCESSOR:  6502

MATCH:   LDY   #0        ;character pointer = 0.          A0 00
         STY   M2        ;position count = 0.             84 ZZ
MTCH4:   DEY             ;because of INY for 1st char.    88
MTCH1:   INY             ;point to next character.        C8
         LDA  (M0),Y     ;fetch character from string.    B1 ZZ
         SEC             ;no borrow.                      38
         SBC  (M4),Y     ;subtract from char in table.    F1 ZZ
         BEQ  MTCH1      ;if difference = 0 do next chr.  F0 F8
         CMP  #$80       ;difference = $80 ?              C9 80
         BEQ  FOUND      ;branch if so.                   F0 1E
         DEY             ;check current table char also   88
MTCH2:   INY             ;next character.                 C8
         LDA  (M4),Y     ;get character from table.       B1 ZZ
         BPL  MTCH2      ;if bit 7 = 0 get next char.     10 FB
         SEC             ;prepare to add extra 1.         38
         TYA             ;offset to A.                    98
         ADC  M4         ;point M4,M5                     65 ZZ
         STA  M4         ;to next word                    85 ZZ
         BCC  MTCH3      ;skipping if no carry            90 02
         INC  M5         ;else increment high byte.       E6 ZZ
MTCH3:   INC  M2         ;increment position counter.     E6 ZZ
         LDY  #0         ;point to 1st character.         A0 00
         LDA  (M4),Y     ;fetch character from table.     B1 ZZ
         CMP  #$FF       ;end of table ?                  C9 FF
         BNE  MTCH4      ;if not do next word,            D0 D9
         STA  M2         ;else position count = $FF       85 ZZ
         BEQ  MTCH5      ;and end.                        F0 08
FOUND:   STY  M3         ;store length-1 of keyword.      84 ZZ
         TYA             ;offset to A.                    98
         ADC  M0         ;move M0,M1 past keyword with    65 ZZ
         STA  M0         ;extra 1 provided by carry.      85 ZZ
         BCC  MTCH5      ;if no carry skip,               90 02
         INC  M1         ;else increment high byte.       E6 ZZ
MTCH5:   LDX  M2         ;load position into X            A6 ZZ
         RTS             ;and return.                     60
```

6809 conversion

DECBIN performs an ASCII decimal to 16-bit binary conversion. It deals only in unsigned values in the range 0 to 65535 and simply returns with the carry flag set on overflow.

The 'advanced' 6809 processor, for which it is written, boasts a quite bewildering set of instructions and, on the face of it, appears to be much more powerful than the humble Z80. The Z80 cannot, for example, multiply or index the stack. However, the most straightforward Z80 translation of DECBIN is only 42 bytes compared with DECBIN's 55 and will convert a valid 5 decimal digit number in 987 T states. DECBIN will do the conversion in 554 T states but, generally, Z80s run at least twice as fast as 6809s.

Readers who are not *au fait* with 6809 code may be reassured that the tenth instruction in DECBIN is only the method by which B gets its end bit into A to make D.

DATASHEET

```
;=DECBIN - ASCII decimal to 16-bit binary conversion
;/CLASS:  1
;/TIME CRITICAL?:  No
;/DESCRIPTION:  Converts a string of ASCII decimal digits terminated
;/              by a non-numeric byte to a 16-bit unsigned binary
;/              value or gives overflow indication.
;/ACTION:  Initially clear 16-bit accumulator
;/         Get next byte and increment string pointer
;/         IF non-numeric THEN exit with Cy reset
;/         Convert from ASCII to single BCD digit
;/         Multiply partial result by 10 and add new digit
;/         IF overflow THEN exit with Cy set
;/         Repeat.
;/SUBr DEPENDENCE:  None
;/INTERFACES:  Memory containing ASCII decimal string.
;/INPUT:  X points to first byte of string.
;/OUTPUT: Cy set: overflow: X = input X + 5, D = ?
;/        Cy reset: D holds binary representation of number
;/                  X points to terminator + 1
;/REGs USED:  CC D X
;/STACK USE:  4
;/LENGTH:  55

;/TIME STATES:  Valid:  559 max.  Overflow:  530 max.
;/PROCESSOR:  6809

          CLRA             ;initially clear 16-bit          4F
          CLRB             ;result accumulator              5F
DIGLP:    PSHS   D         ;save partial result on stack    34 06
          LDB    ,X+       ;get new digit and point to next E6 80
          CMPB   #$30      ;test for non-numeric terminator C1 30
          BLO    VALIDX    ;and exit with valid result in D 25 29
          CMPB   #$39      ;if terminator reached           C1 39
          BHI    VALIDX    ;                                22 25
          ANDB   #$0F      ;convert from ASCII digit        C4 0F
          SEX              ;to a 16-bit value               1D
          PSHS   D         ;and save on stack               34 06
          LDA    2,s       ;get partial result hi-byte and  A6 62
          LDB    #$0A      ;multiply by ten                 C6 0A
          MUL              ;                                3D
          TSTA             ;test for overflow               4D
          BNE    OVFLWX    ;and exit if so                  26 13
          STB    2,S       ;hi-byte back to stack           E7 62
          LDA    3,S       ;get partial result lo-byte and  A6 63
          LDB    #$0A      ;multiply by ten                 C6 0A
          MUL              ;                                3D
          ADDA   2,S       ;add in the hi-byte * 10         AB 62
          BCS    OVFLWX    ;and exit if overflow            25 08
          ADDD   ,S        ;add in new digit                E3 E4
          BCS    OVFLWX    ;and exit if overflow            25 04
          LEAS   4,S       ;restore original stack position 32 64
          BRA    DIGLP     ;and repeat.                     20 D4
OVFLWX:   LEAS   4,S       ;restore original stack position 32 64
          ORCC   #$01      ;set Cy flag to show overflow    1A 01
          RTS              ;and exit.                       39
VALIDX:   ANDCC  #$FE      ;reset Cy flag to show valid     1C FE
          PULS   D,PC      ;result.Recover result and exit. 35 86
```

Dead key scrolls

One sound reason for programming in machine code instead of Basic or some other high level languish (sic) is for speed of execution. But when it comes to displaying the results of your hard labour it is often a case of 'now you see it, now you don't' — with the emphasis on the latter state.

Geoff Ticehurst has solved the problem of machine code scrolled displays disappearing off the top of

MULTICOMP BRINGS YOU SINCLAIR SPECTRUM & ZX81 SOFTWARE

WE HAVE RE-STOCKED AFTER LAST MONTH'S OVERWHELMING RESPONSE! WE ARE TAKING ORDERS RIGHT THROUGH XMAS!

DLAN Spectrum 16/48K
A Display Language to create moving textual displays. Allows definition of 'windows' anywhere on the screen which may be scrolled in any direction; and more $25.00

MASTERFILE Spectrum 48K
The most complete in filing and retrieval systems like relational databases found on big machines! Fully menu driven. Gives views of your data in any sequence and screen layout. Search/update/scroll/print and more! Built-in total/average function and with own code Basic it functions like a spreadsheet. Works perfectly with Microdrives $39.95

MASTERFILE 16 Spectrum 16K
A special version of the larger MASTERFILE for the 16K Spectrum retaining most of its superb features. File compatible with 48K version $25.00

LOCO Spectrum 16/48K
The very latest in brain fun guaranteed to send you local New puzzle game featuring high-res pictures $22.00

GULPMAN Spectrum 16/48K
Spectacular arcade game; makes you-know-who-man look rather plain! Menu selectable 9 grades, 9 speeds and 15 maze formats! Also special demo mode; superb! $19.95

SPDE Spectrum 16/48K
Disassembler/Editor for all 800 plus Z80 operations at machine code speed! $19.95

THE FAST ONE ZX81 16K Upwards
This is the ZX81 version of MASTERFILE, less colour! $29.95

GULP2 ZX81 16K Upwards
This is Spectrum GULPMAN for ZX81, almost identical $15.95

Cheques, money order or bankcard to . . .

MULTICOMP PTY. LTD.
DEPT A12, PO BOX 217, EAST BENTLEIGH
VIC 3165

Add $1.50 per program P&P. Programs found faulty replaced if returned within 7 days. Send SSAE for more details.

DEALER ENQUIRIES WELCOME

his TRS-80 screen before he has even had a chance to blink by a delay routine which can be switched on or off by a press of the space bar.

SLOWUP uses the Z80 CPL instruction to invert the bits in a delay counter when the space bar has been pressed. One press will turn a long delay to a very short one, the next press will turn it back to a long delay again, and so on. SLOWUP also halts completely until the space bar is released.

The long and short delays can be adjusted by changing any of the delay counter (stored in memory), the bit mask (in the seventh instruction) and the repeat counter (loaded into B in the fourth instruction).

SLOWUP is written to make use of the TRS-80 keyboard input memory mapping. To adapt the routine so that it uses your monitor keyboard input routine (called INKEY for want of a better name), change the three instructions after DJNZ SLOWA to read:

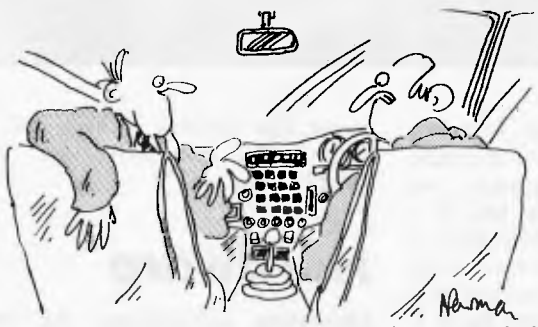
```
CALL INKEY; get char.
keyed in to A
CP 20H; is it a SPACE?
JR NZ, SLOWD; jump out if
not.
```

And the three instructions at label SLOWC to:

```
SLOWC: CALL INKEY;
check if SPACE
CP 20H; is still pressed
JR Z,SLOWC; and loop till
not.
```

DATASHEET

```
;*SLOWUP - Switchable delay
;/CLASS: 2 (uses direct addressing and is system specific)
;/TIME CRITICAL?: Possibly
;/DESCRIPTION: Alternates between a very short delay and a longer
;/             delay on space bar press.
;/ACTION:  Get delay counter
;/         Mask out bits for fine tuning of delay length
;/         Delay loop for delay count
;/         IF space bar pressed THEN invert counter bits and store
;/         Exit when space bar released
;/SUBr DEPENDENCE:  None
;/INTERFACES: Delay counter in RAM.  Memory mapped key input.  Keyboard.
;/INPUT: Delay counter must be in RAM.
;/OUTPUT: Delay caused.  Delay counter complemented if SPACE pressed.
;/REGs USED: None
;/STACK USE: 6
;/LENGTH: 46
;/PROCESSOR: Z80

SLOCT:    DEFW   0F001H        ;delay counter in RAM
SLOWUP:   PUSH   AF            ;save registers                    F5
          PUSH   BC            ;                                  C5
          PUSH   HL            ;                                  E5
          LD     B,2           ;repeat counter for longer delay   06 02
SLOWA:    LD     HL,(SLOCT)    ;pick up delay counter from RAM    2A YY YY
          LD     A,H           ;mask out hi-byte bits 0 to 3      7C
          AND    0F0H          ;for fine tuning of delay          E6 F0
          LD     H,A           ;                                  67
SLOWB:    DEC    HL            ;do delay by counting down         2B
          LD     A,H           ;delay counter until zero          7C
          OR     L             ;                                  B5
          JR     NZ,SLOWB      ;                                  20 FB
          DJNZ   SLOWA         ;repeat till repeat count zero     10 F2
          LD     A,(3840H)     ;TRS 80 key input memory mapping   3A 40 38
          BIT    7,A           ;see if space bar is pressed       CB 7F
          JR     Z,SLOWD       ;and exit if not                   28 10
          LD     HL,(SLOCT)    ;else pick up delay counter and    2A YY YY
          LD     A,H           ;complement it to switch from long 7C
          CPL                  ;to short delay or vice versa for  2F
          LD     H,A           ;next time SLOWUP is called        67
          LD     (SLOCT),HL    ;and put it back                   22 YY YY
SLOWC:    LD     A,(3840H)     ;loop till space bar is released   3A 40 38
          BIT    7,A           ;                                  CB 7F
          JR     NZ,SLOWC      ;                                  20 F9
SLOWD:    POP    HL            ;restore all registers             E1
          POP    BC            ;                                  C1
          POP    AF            ;                                  F1
          RET                  ;and exit.                         C9
```



'. . . and the in-car computer gives you an up-to-the-minute calculation of the chances of your having an accident while watching the in-car computer.'

RIBBONS

Low Price • FREE Shipping
SATISFACTION GUARANTEED

RIBBON CARTRIDGES
top quality factory fresh

Cartridges for use on these printers:
MX-70, MX-80, IBM PC, MX-100, Prowriter, PC 8023A01 RS LP2, LP3, LP5

	price each in quantity of 1-5	6-23	24-99	100+
MX-70.80	12.60	11.60	10.60	9.60
MX-100	19.96	17.36	15.09	13.13
C-ITOH 1550-8510, NEC 8000/DEC LA 50	12.30	11.30	10.30	9.30
R.S. LP2, LP3, LP5	9.98	8.98	7.98	6.98
DIABLO HYTYPE 11				
CARBON	8.30	7.30	6.30	5.75
FABRIC	10.58	9.58	8.58	7.75
DATA ROYAL/DATA SOUTH	11.80	10.80	9.80	8.95
PAPER TIGER	14.35	13.35	12.35	11.50
QUME CARBON MULTI STRIKE	6.50	5.50	4.75	4.25
FABRIC	8.50	7.50	6.75	6.25
QUME SPRINT 4 & 9 CARBON	10.70	9.70	8.70	8.25
RICOH CARBON MULTI STRIKE	9.10	8.10	7.75	7.25
TALLY 1000	11.90	10.90	9.95	9.25
WANG 2281 CARBON MULTISTRIKE	8.40	7.40	6.95	6.25

SEND ME YOUR OLD CARTRIDGE WITH YOUR ORDER
AND I WILL REFUND $1.00 FOR EACH CARTRIDGE

CPM DATA SYSTEMS PTY LTD
184A BARKLY STREET, FOOTSCRAY 3011
P.O. BOX 211, FOOTSCRAY
Telephone: (03) 687 6790, 689 8690

DATASCAPE

— "The Printer Specialists"

For Sales and Service of

Anadex

NEC

NDK

Printers Australia wide

DATASCAPE

Datascape Int. Pty. Ltd.
Sydney Office:
33 Grosvenor Street, Neutral Bay Junction N.S.W. 2089
Telephone: (02) 909 1233, Telex: AA71150
Melbourne Office:
27 Raglan Street, South Melbourne, Vic. 3205.
Telephone: (03) 690 3622, Telex: 30458.

Brisbane: (07) 371 7366
Adelaide: (08) 332 8666
Canberra: (062) 80 5283
Hobart: (002) 72 8622

BENCHTEST

TANDY MC-10

The Tandy MC-10 marks the debut of another competitor in the sub-$200 market. Aimed at the first-time buyer and leaning heavily on support from its big brother, the TRS-80 Colour computer, Surya set out to examine its worth.

At first sight, the Tandy TRS-80 MC-10 looks something like a cross between a VZ200 and an Oric. It is the same sort of size, has a similar system to the VZ200 for keyword entry and, selling at $180 for the 4k model and $80 for the add-on 16k RAM-pack, this would certainly appear to be the market at which Tandy is aiming.

The MC-10 is a downmarket version of the TRS-80 Colour computer. It uses a similar processor and the Basic is almost identical except where graphics are concerned. The profile of the MC-10 is very much a beginner's machine with all the frills of its more expensive brother left out in order to bring the price down to a level acceptable to the first-time buyer. It is unlikely that anyone would consider it as a second micro due to its rather limited power. The machine is cheap and basic and makes few pretensions to be anything else.

Hardware

Measuring 22X18X5cm, the MC-10 stands higher than the VZ200 but is smaller in width and depth. According to

the manual the machine weighs in at '836.32 grammes'.

The casing is a fairly robust-looking white plastic. The legend 'Micro Colour Computer' is emblazoned across the top of the machine and the company logo is in the top right-hand corner.

On the right-hand side is the power on/off switch. At the rear of the machine are (from left to right): the AC adaptor socket, TV socket, reset button, RS232C serial port and cassette port. The reset button is coloured red but the colour signifies no particular danger, because reset performs a 'warm start', leaving memory contents unaffected.

Between the reset button and the TV socket is a metal strip held in place by two screws. Removing this plate reveals the edge-connector for the 16k RAM-pack.

The underside of the machine bears the greeting: 'Opening case will void warranty.' This label covers one of the four screws holding the case together and is impossible to replace without leaving evidence of your action. A small panel tells you which channel the machine is tuned to and a speaker grille is beneath it.

And that concludes connections to the outside world. No doubt Tandy or other companies will find other uses for the edge-connector at the rear of the machine, but the machine seems to have placed itself firmly in the 'first-time user' class with few easy expansion possibilities.

Keyboard

The keyboard is similar to a calculator in size and feel. The keys are closer together than those of the VZ200 — a bit too close for someone with fairly large hands —but are more responsive, giving both an audible click and positive tactile feedback.

The MC-10 has two options for keyword entry. The first of these is simply to type the word in full as with most machines. The second option is to hold down the control key to allow dual-key access to about two thirds of the available statements and commands. If you are used to the VZ200 keyboard for keyword entry, this is likely to be more of a hindrance than a help: the positions of the keywords on the MC-10 are totally different.

The distribution of the keywords around the keyboard is based on function, so, IF, THEN and ELSE are grouped together. As I am familiar with the VZ200, I found the layout unsettling at first but eventually got used to it.

I was generally unimpressed with the keyboard. There is no manual or auto repeat. The keys are too small and too closely spaced. There is a large space bar, but the ENTER key is only marginally larger than the alpha keys and certainly does nothing to suggest to the first-time user that it is particularly significant. There is only a single shift key, placed at a higher level than the space bar and on the right-hand side of the keyboard. To enter brackets, I found myself continually tying my hands in knots. The break key, too, is badly placed right above the ENTER key; it is all too easy to hit accidentally. Also, the CONTROL key is where you'd expect a shift key to be.

On the plus side, the arrow keys (they don't give full cursor-control as you might expect from their appearance) are sensibly placed, using control-W,-Z,-A and -S for up, down, left and right respectively. This and the reasonably positive feel of the keyboard is about all I can honestly find to say in its favour: it's not a keyboard I would like to use all the time.

Inside

Venturing inside the machine (voided warranties hold no fear for *APC* reviewers!), I found that two flat cables prevent the case being opened more than 90 degrees. To open it right the way out would involve removing the keyboard casing. Having played that game before on a different machine and ending up with keys scattered all over the floor, I settled for 90 degrees.

The processor is a Japanese 6803. Other than that, the innards held no surprises. The chips, as one would expect in a machine of this size, are soldered directly onto the board. Everything appears neat and ship-shape — no signs of any last-minute changes — and all the components are clearly labelled. Together with the circuit diagrams (not supplied) it would be easy enough to find your way around.

The 6803 is almost identical to the 6809, and was probably selected by Tandy on the basis of price; the 6803 requiring less in the way of support chips.

MC Basic

Normally, Benchtesting a machine with its own version of Basic, I would expect to devote a fair amount of time and space to examining the features of that particular implementation of the language. But in the case of the MC-10. I can find very little to say.

The MC-10 supports a Basic known as MicroColor Basic. A year or two ago, MC Basic would have been acceptable though uninspiring, offering a total of fifty-eight statements and/or commands. Today, such a limited implementation of the language is quite unacceptable even — some would say, especially — for a first-time user's machine.

Tandy is not out to make us into structured programmers. MC Basic supports neither WHILE-WEND nor REPEAT-UNTIL. Nor is any form of defined function or procedure offered.

The only feature worthy of note is CSAVE*. CSAVE* allows you to save the contents of a numeric array directly onto tape under a given filename. The array is then read back in by the CLOAD* statement. Anyone who has painstakingly written routines to perform just this function with several different arrays will appreciate just how useful this feature is.

Other than CSAVE* and CLOAD*, MC Basic conforms to standard Microsoft Basic to the extent of supporting little more. All the standard operators are supported including logical AND, OR and NOT. If you are familiar with just about any dialect of Basic, you'll have no problems finding your way around MC Basic.

Graphics

As with the Basic, the graphics are very limited in comparison with other colour machines. The addition of colour is the only difference between MC graphics and standard TRS-80 graphics.

The graphics are low-resolution, comprising a 64×32 grid. SET (x,y,z) lights up block (x,y) in colour z. RESET (x,y) switches the block to the current background colour, and POINT (x,y) returns the current colour code of the specified block.

The MC-10 supports eight colours (plus black, of course) using the codes 0 to 8 inclusive. CLS z sets the background colour to z; default is green. The MC-10 can display graphics on any of the eight background colours, but alphanumeric characters can only be displayed on the green background.

The character strings 128-143 inclusive provide sixteen low-resolution graphics characters. Adding various values to the ASCII code allows these characters to be printed in any of the available colours.

The character set

The MC-10's character set is standard ASCII but — as with Tandy's other colour machine— the video display supports upper-case only. Lower-case characters can be sent to the printer, these appearing on the screen in inverse.

Editing

I am prepared to put up with a fair number of shortcomings on a machine selling at

$180. I don't, for example, expect a full screen editor. But in the absence of such a luxury I do expect a good old-fashioned line editor. The MC-10 does not oblige. It offers no form of program editing whatsoever. No screen editor, no line editor, nothing.

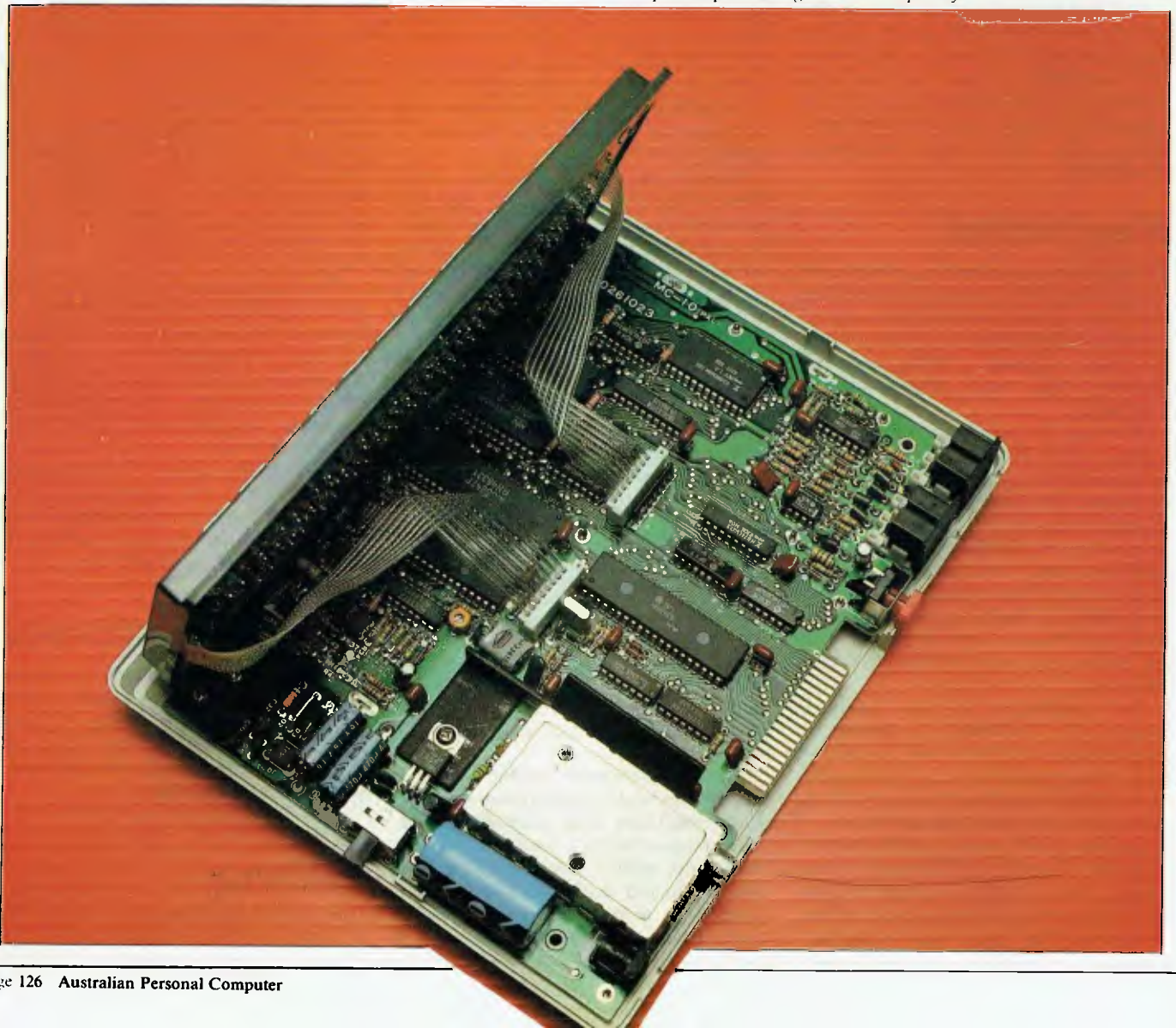
I could rant and rave for some considerable time about the unmitigated gall of a company producing a machine which expects the user to type in an entire line all over again simply because the poor thing missed out a comma between the third and fourth characters. But I'll restrain myself. When I asked Tandy about the lack of an editor, I was told that it was for reasons of cost 'and anyway, most kids don't mind typing things in again'.

Documentation

Documentation takes the form of the 'Radio Shack TRS-80 MC-10 Micro Colour Computer Operation and Language Reference Manual'. The manual is, in

The TP-10: a low-cost thermal printer producing dot-matrix quality.

The processor is a Japanese 6803, sister to the 6809.



I N F O R M A

The Ultimate Microcomputer Database Management System

s.i. microcomputer products pty. ltd.

23 Berry Street, North Sydney, N S.W. 2060
Telephone (02) 922 3977. Telex: AA71139
Postal Address: PO Box 1650, North Sydney, N S W 2060.

Insert X929 on Information Feedback Card

places, almost as verbose as the title, but given that the machine is aimed at beginners this is probably no bad thing.

Comments on manuals are always highly subjective since we all have our own ideas about how manuals should be written. The MC manual is a pretty average tutorial-style ringbound affair comprising some 140 pages. In common with many home computer manuals, it lacks a cross-referenced index. The contents list at the beginning of the manual, though, is comprehensive and acts as a rather short index.

For those familiar with programming in Basic, Appendix F — the MC Basic summary — and the quick reference card contain most of the information you'll need. For beginners, the tutorial appears adequate, though it is highly patronising in sections. Witness: 'Try typing in the following line exactly as it appears below (be sure OK is displayed):
PRINT "HI, I'M THE MC-10"

'Now check the line. Is it exactly as above? Be sure to check the spelling of the word PRINT and the quotation marks, especially the first quote.'

In general, the manual is adequate and accurate: I discovered only one error in the keyword syntax (missing comma in SET).

Software

Tandy claims that the MC-10 will run any existing TRS-80 Colour Basic software with what it describes as 'minor modifications'. On checking with Tandy, it appears that this statement (made in a press release) should have said that existing Colour Basic *listings* can be *typed* in with 'minor modifications'. Programs for the standard Tandy Colour Computer cannot be loaded from cassette.

Peripherals

As I have already mentioned, the MC-10 is not designed with expansion in mind. Tandy has no immediate plans to produce any add-ons beyond the 16k RAM pack and a printer known as the TP-10.

The MC-10 has an RS232C port in the form of a four-pin din socket. This enables it to be hooked up to any Tandy printer with a serial interface. (It can also be hooked up to other printers provided that they can be set to perform a line feed on receipt of a carriage return. This is necessary since the MC-10, as with other Tandy machines, does not send a line feed character with a carriage return when printing. Tandy printers automatically line feed with each carriage return.) Tandy, has also produced its own printer specifically for the MC-10: the TP-10.

The TP-10 is a thermal printer (that's why it's called TP) which will sell at just under $150.

TANDY MC-10

'The MC-10 is a downmarket version of the TRS-80 Colour computer.

The maximum column width of 32 (across four inches) precludes serious wordprocessing applications even if the MC-10's keyboard hadn't already done so, but the printer is perfectly adequate for invoices, program listings and so on.

Printing speed is reasonable at 600 baud and, being a thermal printer, the TP-10 is almost completely silent in operation. Surprisingly, the quality is comparable with dot-matrix output. As well as upper and lower case, the TP-10 will also print the block graphics characters produced by the MC-10.

The TP-10 can also be used with other machines with a serial printer port.

Conclusions

I have little doubt that the MC-10 will sell.

To the person with little experience of computers, Tandy computer stores are a natural place to go simply because they are so accessible. This is important both from the point of software availability and servicing and repair. Any machine which sells well generates a proliferation of software and — given the similarity between Colour Basic and MC Basic — no doubt software houses will hurriedly convert all their existing Tandy Colour Basic software.

In a market with more than its fair share of cowboys and fly-by-night companies, the fact of a long-established company with a large chain of retail stores is reassuring, particularly to those new to the game of computing.

Aside from the matter of the non-existent editor, the MC-10 does serve as an adequate machine on which to learn about micros. A beginner is not going to miss facilities s/he has never heard of. The question I found myself asking was 'just because a machine is aimed at beginners, is this any reason to provide a less powerful language?'

When choosing a computer in this class, much of the process is subjective of course. Some of the comments I made about the keyboard might be quite irrelevant to some users — particularly younger children whose fingers will be a lot smaller than mine.

Given this, the price-tag of $180 places the MC-10 in direct competition with Dick Smith's VZ200. Whether you look at the amount of RAM offered as standard, the power of the Basic, the MC-10 does not stand up well to this comparison. The field of expansion is less easy to define, since, if Tandy has any expansion plans, it is keeping them to itself.

The MC-10 is now available for $20 less than the VZ200. To the extent that the MC-10 is intended as a beginner's machine, it does a good job.

Benchmarks

BM1	1.5
BM2	9.1
BM3	17.3
BM4	18.9
BM5	20.3
BM6	29.9
BM7	44.3
BM8	112.0

All timings in seconds. For an explanation of the Benchmark programs, see APC Vol 3 No 11, November 1982.

Prices

4k TRS-80 MC-10 MicroColour Computer	$179.95
16k add-on RAM pack (bringing total RAM to 20k)	$79.95
TP-10 Thermal Printer	$149.95

Technical specifications

Processor	6803
Standard RAM	4k
Maximum RAM	20k
Interfaces — printer	RS232C (4-pin din)
— cassette	5-pin din
Power requirements	Mains adaptor supplied: 1.5A at 8VAC

CHECKOUT

GEMINI—15X PRINTER

The GEMINI—15X dot matrix printer is a new offering on the already immense printer market. Dot matrix printers are a fairly well established and stable technology with printers available to service almost any area in the low to medium speed printing spectrum. Dot matrix printers really come into their own with the feasibility of using microprocessor based control circuits. With a micro on board the manufacturing cost difference between a dumb printer and a relatively clever one became only $2 to $10 per unit, and hence printer manufacturers set out to make more intelligent dot matrix printers. At this point in their evolution, it is really only the printing mechanism which widely distinguishes printers — some being faster than others, some being more robust.

Although most dot matrix printers in a similar price bracket do tend to contain the same amount of intelligence, the control sequences used to implement that intelligence is becoming more of an issue. This is due to the trend of the PC industry as a whole to move towards packaged applications, rather than writing individual Basic programs. (I am not saying that people are no longer writing Basic — there are more Basic programers today than ever before, but I believe that they are now outnumbered by the non-programmers. This is a natural side-effect of greater PC penetration.) The question now when buying a printer is not "what are its capabilities", but can the major word processors and (in the case of dot matrix) graph packages drive the printer. Naturally the software does not tend to employ *every* possible printer capability, but there are several elementary functions which are in common usage, such as bolding (word processors) and bit map printing (graphics). The more enlightened software packages allow you to define new printer control sequences, but many only support a standard list of recognised printers. The warning here is, of course, make sure that your software will support your intended printer.

The Gemini is a 120 cps printer with a wide carriage capable of handling 15 inch (38.1 cm) paper. It is provided with a Centronics parallel interface, with an optional RS232C interface being available. It supports variable character and line feed pitch and can handle both sprocket and friction feed paper.

The printer provides two banks of option switches, only one of which is accessible without unscrewing the top of the machine. The internal switches provide control over power-up default settings, international character sets and form length, while the external switches allow control over the interface conventions. Indicator lights on the front panel show power, ready, on line and paper-out conditions, while the three standard push buttons are provided for on-line, form feed and line feed. Holding down the line feed button while the printer is powered up will cause the automatic self-test to execute.

The printer is capable of black graphics, bit map graphics, standard characters and italicised characters. And, in addition to the above, you can also download your own character set. This function has been rather well thought out, and includes the ability to copy the standard character set over to the download character set work area, thereby giving you the freedom to redefine a few selected characters to be logos (or whatever), without the need to

MICROCOMP. SAFE, SOUND, AND STATE-OF-THE-ART

At Microcomp, we're proud of our successful four-year track record in microcomputer sales and service. But we're also proud to add innovation to that record of reliability.

If it's new, and if it's good, we'll get it. For instance.

VIDEOTEX. Turn your IBM PC into a colour Videotex terminal. High resolution colour graphics is an added bonus.

POINT OF SALE. Connect cash registers to IBM and SIRIUS PCs, to automate your Debtors and Stock.

PC-TO-MAINFRAME. We can help you incorporate microcomputers into your mainframe network.

Any questions? We'll be delighted to answer them.

sirius COMPUTER

IBM Authorised Dealer IBM Personal Computer

CALL US ON 614 1433.

B. S. MICROCOMP PTY. LTD., 561 BOURKE STREET, MELBOURNE 3000. JLM/MC13

QUALITY SOFTWARE FROM COMPUTER TECHNICS OR THROUGH MOST MICROBEE DEALERS

DIGITAL CONCEPTS

A DIV OF COMPUTER TECHNICS

MICROBEE SOFTWARE

CHATTER BEE: PHONEME SPEECH SYNTHESISER. Unbelievable speech price breakthrough! This program takes up 8K but gives you unlimited easy to program speech. Just type in the phonemes you want it to speak **plus** unlimited previously unavailable sound effects. Beware of speech software which takes up masses of memory for a few seconds of unintelligible speech. NO EXTRA HARDWARE NEEDED!
ONLY $29.50

GRAPHICS-PAK: Ever wanted to write a good program but were turned off by hard to use Hires? This amazing package can draw into two different block sizes. Objects can be mirrored, inverted, rotated and reflected etc. The graphics objects are then stored as files and can be stored on tape for use in your own programs. **Great value at $29.50**

DATA BEE: The ultimate cassette database: Search, sort, print labels, lists. This is totally flexible and comes with comprehensive manual. **$19.95**

TEXT EDITOR: An easy to use Word processor for those with better to do than memorize complex operating procedure. 80 column when used on an IC. GREAT VALUE AND VERSATILE!!! **$16.95**

FORTH: The most powerful version of MBEE Forth written for the Bee. This version costs a little more but includes a tutorial; decompiler; screen editor; hex-dump; graphics and sound; programs and an extensive quality printer manual. Well worth that bit extra at only **$45.00**

FINANCIAL MANAGER: A very useful program for business or home. 20 expense categories, WDL, DEP, INT, BAL, DATE, E.C. CH NO, INPUTS. Great for budgeting account reconciliation, cash flow analysis auto date resort and recalc. **$16.95**

BEE BUG: The perfect debugging tool. Combines extended monitor with disassembler single step and a host of other features. THIS IS WORTH A LOOK!!! Comes with 15 page manual. **$16.95**

DECODE: A disassembler that disassembles BASIC!! Decode all your basic programs and find many useful routines embedded machine code self modifying code etc. **$16.95**

FILE INDEX: Records may be searched for in alphabetical sequence, by a single postcode, by a group of postcodes and by key word. **$16.95**

ALL TAPES GUARANTEED
TO BE LOADABLE
EXTENSIVELY DOCUMENTED
QUALITY PACKAGED
QUALITY PROGRAMS

MEMORY MAP: The most comprehensive Microbee mem-map available. 16 pages of address locations, jump vectors, poke addresses etc. Over 500 sold. Essential if you're a programmer. **$5** inc P&P

COMMODORE 64/VIC 20

VIC 20/64 LIGHT PENS: Quality Opti-wand light pen. Both sensitive and accurate and comes complete with documentation and demo/games tape for VIC 20/COM 64 **$39.95** P&P Free

VIC EXPANSION: 3 Slots, Each Slot Switch selectable, On Board Reset. Quality Australian Made **$59.95** P&P Free

Low Cost Joysticks: Quality Microbee Joysticks available now. The first 100 people to purchase these joysticks can buy a copy of Space Patrol (Joystick version) for only $6 and put the joystick to good use. **$20.50**

NEW ANTIGLARE!
MICRON GREEN SCREEN
ONLY **$179.50** inc tax
Available mid January
Freight $12.50 Australia wide

Phone orders welcome

SPACE PATROL: High resolution real time game with sound and graphics. Similar to the popular 'scrambler' game. **$16.95**
SEA BATTLES: A classy classic. Like battleship but you play the computer. Excellent graphics and sound. By Darryl Fosbery of Coastal Software. **$16.95**
BLACK FOREST: Strategy game set in battlefields of medieval England for one to four players. Can you conquer the cunning mythical inhabitants of The Black Forest. **$18.95**
AMAZON: Can you find the lost Inca tribe treasure? BEWARE many obstacles lie in your way. (16K text) **$14.95**
DON'T PANIC: Want something different in an adventure? Guide Mervin the paranoid Android through the trials of Intergalactic Space so he can succeed in his mission. **$16.95**
UNDERWORLD OF KIN: Yes, this is one of ours! An adventure game in the classic tradition with graphics. Kill the wizard and escape the underworld. CAN YOU DO IT??? **$14.95**
POKER MACHINE: An advanced Hires colour graphic poker machine with excellent sound. WHY GO TO THE R.S.L.??? **$15.95**
DRAW POKER: Hi Res color as in the popular arcade/pub Draw Poker **$15.95**
SCREEN DUMP: Two machine code programs. Use them in your own programs. Produce both horizontal and vertical screen dumps to printer. **$14.95**

WRITE FOR INFORMATION ON EPROM BASED BUSINESS AND UTILITY SOFTWARE AND LOW COST ROM EXPANSION BOARDS. PLEASE SEND S.S.A.E. (Lge)

ORDER FORM

FREIGHT OR P&P	
CH/BANKCARD/MO TOTAL	

Name .....
Address .....
Suburb ..... Postcode .....
Bankcard No .....
Signature .....

computer technics
123 Clarence St, Sydney 2001

FOR COURTEOUS ADVICE
OR ORDERING PHONE:
(02) 29 7244

WELCOME

ORDERS TO
G.P.O. BOX 4936
SYDNEY 2001
All Software P&P Free

PRINTER OFFER

STAR GEMINI — 10X
AN UPMARKET PRINTER
REDUCED
TO A DOWNMARKET PRICE!

YOU'VE READ THE REVIEW . . . NOW BUY THE PRINTER!

LIMITED OFFER

WAS $672

$499

FREIGHT $12.50 AUST-WIDE

The STAR GEMINI-10X is America's best selling printer. Forget all those XYZ-80 clones with expensive running costs (cartridge ribbons). If you want a more versatile, faster and longer lasting printer normally you would have to pay substantially more. Now for less than the price of an XYZ-80 clone and for a limited period you can purchase a quality, high speed, long lasting printer with low (conv. spool ribbon) running costs.

LOOK AT THESE FEATURES:

Sprocket, Friction and Single Sheet Feeds; 120cps Bidirectional Logic Seeking; 80, 96, 136 char/line; 9 dot head for true descenders: Block and Bit Addressable Graphics: Proportional Spacing, Compressed, Expanded, Italic, Super and Subscript, Normal/Special Character sets: Special Correspondence Quality Printing Mode: Epson Codes are Compatible with this Printer; Original & Two Copies on Sprocket; Buffer

C64, VIC 20 OWNERS

NO, WE HAVEN'T FORGOTTON YOU!!!

We have made available at low cost (when purchased with Printer) these Vicsprint Intelligent Interfaces and Cable assemblies.

★ Converts unintelligible codes so Printer prints (blu), (clrh) etc.

★ CBM to ASCII conversion ★ Upper and lower case ★ Italic and Auto line feed ★ Straight through mode ★ 1 year guarantee

Purchased Individually **$119**. With Printer only **$75**

WE CAN ALSO SUPPLY HIGH SPEED AND WIDER CARRIAGE PRINTERS AT VERY COMPETITIVE PRICES. PLEASE RING FOR DETAILS

WE CAN SUPPLY PRINTER CABLES FOR MOST POPULAR TYPES OF COMPUTERS AT **LOW** COST. PLEASE SPECIFY YOUR COMPUTER TYPE WHEN ORDERING CENTRONICS CABLES . . **$49.50**
RS232 . . **$45.50**

computer technics

SEE PREVIOUS PAGE FOR ADDRESS, PHONE AND ORDERING INFORMATION

ELECTRONICS MANUFACTURERS & DISTRIBUTORS

These Printers come with a standard 3 months warranty. However, our service department can offer a service contract extending this to 12 months for only $45

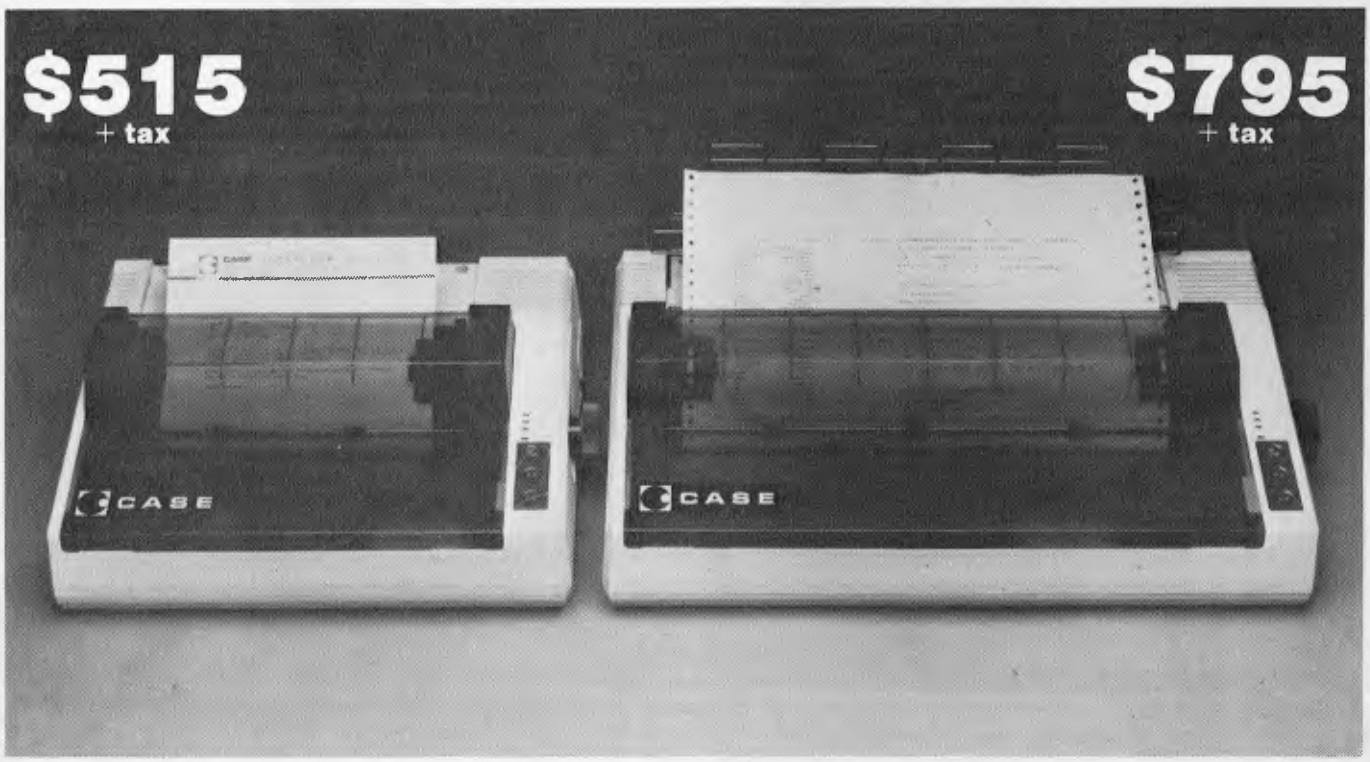
THIS OFFER ONLY APPLIES AT TIME OF PURCHASE

WHY???

Last month these Printers were selling for $672 retail (our price $650) Previously Computer Technics have only advertised in Your Computer magazine. The importer reduced our cost price and we reduced our margin in order to guage advertising response from A.P.C. This offer is for a limited period only.

UPMARKET AND HIGH SPEED PRINTERS

Write off 40%



CASE has released two new models in its DPX Series matrix printers.

If it weren't for their price, their capabilities alone would make them remarkable machines.

But at around 40% cheaper than their nearest competitor, they deserve your closest scrutiny.

The multi-function capability of the DPX series enables use in a variety of applications. Alpha numeric or graphic printing, single sheet, roll or tractor feed paper.

They can even produce correspondence quality print and provide forms control plus vertical and horizontal tabulation.

The DPX 500 printers operate at 120 CPS, with 80 characters per line on model 510, and 136 characters per line on the wider carriage 515.

After you've compared these two machines to others on the market, you'll have to agree with us. It's an open and shut case. For CASE.

For complete details on CASE DPX 500 printers, contact your nearest CASE office.

CASE

CASE Communication Systems Ltd.

SYDNEY: 1-3 Rodborough Rd., Frenchs Forest, N.S.W. 2086. Ph. (02) 451 6655. MELBOURNE: Ph. (03) 529 7644. BRISBANE: Ph. (07) 221 4727.

CSY5025

CHECKOUT

GEMINI-15X PRINTER

define your own normal characters as well.

Each print position is a 9 x 9 matrix, of which 7 x 9 is usable, the top seven for non-descender characters and the bottom seven for descender characters. This method produces good quality descenders without overcomplicating matters. Bit image graphics can be performed in one of four densities, ranging from 60 dots per inch up to an impressive 240 dots per inch. Naturally, the printing is quite slow at high density, but the quality of graphical output is outstanding. Both compressed and expanded characters are software selectable, providing up to a maximum of 233 character columns on 15 inch paper.

Other software commands provide for double-striking, underlining, emphasised printing, super- and sub-scripts, uni- and bi-directional printing, pitch selection, forms length, perforation skip, vertical and horizontal tabs, margins and interface control. The Gemini also supports the ability to define macro instructions. This ability is rather restricted, however, as only a single macro may be defined, and its maximum length is 16 characters. I see that the most useful application of a printer macro is to reduce low speed communication line loading for repetitive sequences by storing the sequences in the printer. This could greatly increase throughput if (for some reason) you were running the printer on a very low speed (e.g.300 baud) serial line. However, the limit of 16 characters greatly reduces the potential benefit.

Mechanically, the printer appears to be sturdy enough,. weighing in at 22 pounds (10 kgs). The print head is driven by a nylon tractor band (as is common with printers of this class), which will reduce print accuracy slightly after a few years of use. The band approach is significantly cheaper than the linear motor method, and its replacement after a couple of years is not a very expensive process. A hefty power supply is located in the rear of the unit with ample heat sinking and plenty of capacitors, and so should not cause any problems in continuous usage. The print head also looks sturdy and business-like. The circuit board contains no surprises and is logically separated into interface, control and driver areas.

In summary, The Gemini is vaguely similar to the FX-100. While it does not support all of the FX-100 control sequences, it does seem to be compatible with the common ones and even includes a few new capabilities. Its print quality is excellent and the Gemini is certainly worth a test drive when you are shopping for your next printer. The Gemini-15X printer is priced at $795 ex tax for the parallel version, (the RS232 option is $75), and is available from Case Communications.

Data Base Manager II®

Now an inexperienced computer user can prepare comprehensive and detailed reports on all aspects of his business. Using DBM II and your IBM PC, figures computed on your spreadsheet can be put into on-screen forms which you design, then printed out in the form of personalised letters using your word processor. DBM II is completely compatible with Lotus 1-2-3, MultiPlan, VisiCalc, WordStar, WordPlus-PC and other leading programs. DBM II is designed to be operated by non-technical users and does away completely with hard to remember codes. It's menu oriented and thoroughly and concisely documented.
RRP (excl. sales tax) $395.

Computerising can be a difficult process. That's why we have ensured that all SCA products are well documented, ready to run and easy to use. But if you do strike trouble, our Customer Support Hotline is just a phone call away. At SCA we offer a full range of customer support services, all designed to ensure that you get the maximum possible benefits from your SCA product.
If you want some more information about what SCA's fine software can do for you, it's yours for the asking. Just telephone or send us your business card. SCA products are available from selected computer dealers throughout Australia. Call us for the location of the dealer nearest you.

Productivity tools for Australian business.
SCA SOFTWARE CORPORATION OF AUSTRALIA PTY. LTD.
Telephone (03) 347 7011. Telex AA30458

MODEL 4 64K 2—DISK RS232
$2995.00

A Logical Solution — The TRS 80 Model 4

★ A near complete Small Business and Personal Computer
★ Fully Tested with RS232 Interface included
★ Two Disk Drives built in and fast "Memdisk" feature
★ 80x24 character display, "key click" feature and sound
★ 4MHz CPU, 64K RAM expandable to 128K
★ Parallel printer interface and software print spooler
★ TRSDOS 6.0 included, CP/M compatible (available soon)
★ Model III mode allows full use of existing software
★ Easy to use and configure — only a single power point
★ Direct import — Over $450 less than normal retail

You require the addition of a printer and application software to give you a low cost business system ready to use.

JWR Systems offers the following options:
★ **64K Memory** upgrade to 128K RAM **$140**
★ **Anti-glare** green phosphor screen **$99**
★ **ALPHA 80** 80 cps Dot Matrix Printer **$450**

Doublesided Slimline Disk Drives, Disk Controller, Upgrade Kits, Hard Drives and other low price options.

Please write or call for details of availability and prices.

J.W. ROSS (Systems) Pty. Ltd.
P.O. Box 200 FOREST HILL CENTRE, VIC 3131
Telephone: (03) 689 2992
(03) 233 7212

STOP PRESS

CITY PERSONAL COMPUTERS OPENS NEW STORE IN NORTH SYDNEY . . .

City Personal Computers, Sydney's leading Apple and IBM supplier, is delighted to announce the opening of its new store in North Sydney.

Right on the corner of Mount and Walker Streets, the new store will boast North Sydney's biggest selection of software, accessories, printers, disks and everything else for the Apple and IBM – and others too.

So now we can offer the finest support in Sydney and North Sydney, support that has made us the leading personal computer suppliers for over 3 years.

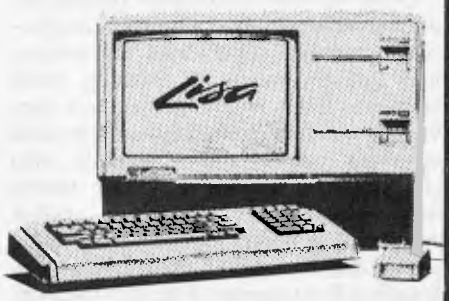
Visit one of our stores today, or telephone for our latest price list. You'll see why we are head and shoulders above the rest.

SPECIALS

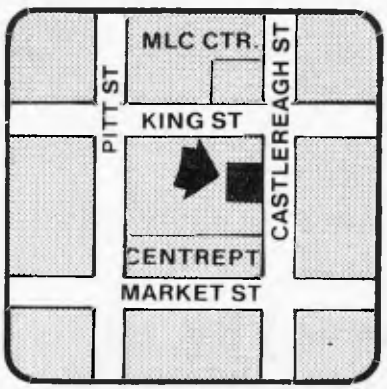
While current stocks last, we are offering amazing deals on Wordstar for the Apple //e. The Starcard package gives you all this:

WORDSTAR
APPLICARD 6MHz Z80 CARD WITH 64K RAM
CP/M 2.2

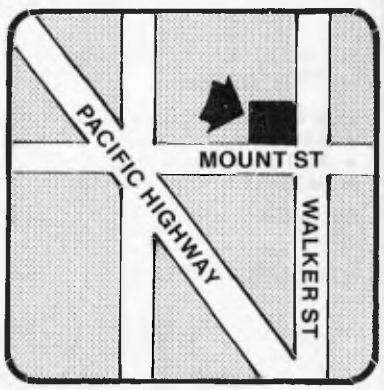
All at an amazing **$745.** But only while stocks last, so call in today for yours.



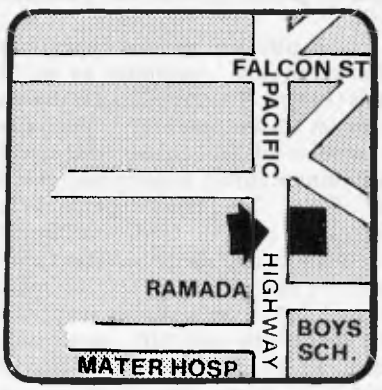
CITY PERSONAL COMPUTERS



CITY OFFICE
75 Castlereagh Street, Sydney, 2000
Phone (02) 233 8922



NORTH SYDNEY
100 Mount Street, North Sydney
N.S.W. 2060
(New office – open mid Dec.)



HEAD OFFICE
5/385-389 Pacific Highway
Crows Nest, N.S.W. 2065
Phone (02) 922 3600

YANKEE DOODLES

Sol Libes presents his monthly round-up of news and gossip from Stateside.

Home computer losses

The losses in the home computer field for the last quarter amounted to over half a billion dollars. Texas Instruments disclosed that it lost $183 million, Atari $310 million and Mattel $24 million. In response TI, Atari and Mattel all fired their presidents.

Commodore was the only company to show a profit. Tandy does not break out the sales of its home computers but sales are believed to be faltering. There are only rumours that the sales of the Timex TS1000 (Sinclair ZX81) have come to a virtual halt.

Mass merchandisers, such as Sears and K-Mart, have indicated a slow-down in the volume of home computer sales. Problems are expected to continue as TI is rumoured about to cut the price of the TI99/4A unit to $50 in an attempt to clear several hundred thousand units out of inventory. Add to this the expected introduction of home computers from IBM and Apple and the woes of the home computer producers are expected to intensify. Atari still has a sizeable inventory of 400 and 800 units and is also expected to slash prices to below cost to liquidate their stock. Atari has also abandoned plans to introduce a computer keyboard attachment for the 2600 video game system. Timex is reportedly considering discontinuing the TS1000 with the introduction of its new 1500 and 2000 models. A major concern of the home computer producers is the introduction of the Coleco Adam system which is a complete home computer, game and word processing system for $600. Coleco claims already to have orders for half a million systems. The unit which wholesales for $525 does not leave much room for discounting. However, it has been pointed out that a purchaser could buy the basic unit and game unit separately for $550. Thus, this could end up becoming the actual selling price for the complete package.

It is apparent that the home computer market has changed dramatically this year. There is a preference for machines that are more useful and more powerful. As a minimum they have to be able to do word processing. And the market has become very price sensitive. Further, the market life of products is shortening; the five year life span of the Apple is a thing of the past.

Prices for home computers continue to fall. The Atari 400 and 800 can be had for as little as $62 and $199 respectively while the Commodore VIC 20 and 64 can be had for $79 and $185. In fact, a complete Commodore 64 system including disk drive, printer and colour display can be had for under $750.

Random Rumours

Sharp Corp, which recently demoed a portable computer with an eight line by 80 character display, is rumoured on the verge of introducing a liquid crystal display with a capacity of 24 lines by 80 characters . . . Beta testing of Version 3.0 of MS-DOS which was supposed to begin in June was reportedly pushed back to September which probably means that introduction may not appear until next year. It is still not clear whether Version 3 will be adopted by IBM for the PC. The new version is expected to include features such as multitasking, mouse input and enhanced graphics . . . Meanwhile, Apple is expected to introduce its long rumoured 'MacIntosh' computer in January 1984 with first deliveries to customers expected in February. It is expected to be a 68000-based transportable unit having a nine inch display, a resolution of 512 x 375 pixels and 128k bytes of RAM and sell for well under $1500. Expected also to use a 3.5in floppy storing a full megabyte, have a significant portion of the system software in ROM and a user interface similar to the Lisa. When the Mac is introduced I expect to see the price of the Apple IIe drop to $700 or under and become available to mass merchandisers . . . Expected soon from several vendors are winchesters with intelligent interfaces that contain microprocessors capable of re-microcoding themselves to adapt to their environment. In other words they would contain their own operating systems. It will be possible with this system for the drive to have a signature that marks the drive as to lot and manufacturing date. This could be used to ward off software pirates. The chip to do this is already in evaluation by disk designers . . . Gavilan shook the industry with the introduction in May of a true full-function portable priced at just under $4000. Now there are rumours that a similar machine is due shortly for one-third of the price . . . Rumoured from Microsoft is a plug-in board for the IBM PC which replaces the 8088 microprocessor with an 80286 true 16-bit unit so that users can run their Xenix, Unix multi-user, multi-processing operating system . . . Radio Shack is expected, later in 1984, to bring out a Model 100-like portable that is IBM PC compatible. It will use a CMOS version of the 8086 that is now available in sample quantities. The Model 100 (which is currently the hottest selling portable) presently uses the CMOS version of the Intel 8085 8-bit micro . . . Look soon for Commodore to discontinue the VIC 20, drop the price on the 64 even further and introduce a new portable machine, using the Z8000 16-bit microprocessor to sell in the $500-600 range. The attempt is to undercut the new entries from IBM and Apple . . . Shugart is expected soon to start demoing their laser-based optical disk. Word is that it will cost $5000 or so and store 1.5 gigabytes (that's 1,500,000,000 characters) and you will not have to worry about a head crash when you bump it or get dirt or moisture on the disk . . . Atari is expected to introduce a home computer with integrated telephone and capability to control home appliances and heating/cooling systems.

Apple doings

Apple, once the bread and butter of Computerland sales, has been largely replaced by the IBM PC. Last year when Apple tried to renegotiate a better contract with Computerland, Computerland baulked and dropped Apple. Many of the Computerland stores were then forced to buy their Apple equipment directly from Apple, losing their Computerland discount, while still paying an 8% royalty to Computerland on each sale. The result was that Computerland stores selling Apples were at a serious disadvantage to independent retailers. Apple purchasers have become very price conscious and this has led to discounting with the result that many Computerland stores have dropped Apple. Apple has responded by reducing the

Morrow

PRICE SENSATION!

$2875*

Inc. 80 cps matrix printer, Freedom terminal, over $3000 of software. LIMITED TIME OFFER

The Morrow is the most fool-proof microcomputer on the market today. Although the hardware is similar to many other Z80 systems, its value-for-money, and its friendliness to the user, your pocket and other systems is unparalleled.

Also in the package is over $3000 worth of software, including WordStar, Correct-It spelling checker, LogiCalc, CP/M2.2 and four languages, and the intelligently ergonomic Freedom 100 terminal.

It will read and write to Osborne 1, Xerox 820, the IBM PC (under CP/M86 format) disks, and execute NorthStar Basic programs without modifications.

User friendly features include on-board diagnostics, front-end menu, error-trapping, and automatic matching of terminal protocols to new software.

Phone for your nearest dealer

Archives Computers Australia Pty. Ltd.,
163 Clarendon Street,
South Melbourne 3205.
Tel. (03) 699 8377
Telex AA39388
16th Floor, 55 Lavender Street,
Milsons Point 2061.
Tel. (02) 922 3188

*Prices excluding Sales Tax

Means Business

MORROW means more and better business.

DEALER ENQUIRIES WELCOME

ARC 474A

YANKEE DOODLES

Apple price, offering it to more retail outlets, such as department stores, and packaging together systems with more competitive prices.

Apple has also disclosed that it has filed suit against 28 Hong Kong companies selling copies of the Apple II and that, in all but five cases, it has succeeded in getting restraining orders. The units, which sell for as low as $300, are for the most part made in Taiwan and imported to Hong Kong. Some even bear the Apple nameplate-logo.

In the meantime Apple announced over $42 million in profits for the last quarter, a 59% increase. Apple also announced that it made its millionth computer and that it shipped the Lisa right on schedule. However, demand of the IIe has reportedly flattened out as business user sales have decreased. The bulk of the IIe sales are now to the home and school markets.

Apple has run into some problems with the Lisa. Many customers are complaining about the hard disk drive with its limited capacity (only 5 Mbytes with about 4 Mbytes used by the Lisa software leaving only about 1 Mbyte for the user's files) and slowness in reading and writing (it can take more than a half a minute to load the word processor and a text file). Apple is thus expected to shortly upgrade the Lisa to a faster drive with 10 Mbyte capacity. Secondly, Lisa floppy disks, which are unique to the Lisa, are as scarce as hen's teeth. Apparently Apple did not plan ahead in floppy disk production. This has caused problems for independent software suppliers trying to sell software for the machine. The result is that there is a reported softening in demand for the Lisa and that units are immediately available from stock.

Apple is expected to introduce soon an option for the Lisa to enable it to run IBM PC software. This project is reportedly being handled by Microsoft for Apple with the product becoming available by mid '84. This option is seen as an important asset for the business world. Thus users will be able to run the Lisa operating system, MS-DOS, CP/M-68K, Xenix and Uniplus+. The last two are operating systems and will require the addition of a second 5 Mbyte drive and extra user ports. UniPlus+ is already being distributed by UniPress, Highland Park NJ and Xenix should become available soon from Microsoft.

Apple is also expected to launch a new marketing strategy that will see it marketing three computer lines based on the Apple IIe, MacIntosh and Lisa with the Apple III being dropped. Expect the IIe's price to drop to well under $1000 and be marketed as a 'home computer'. The Mac will be the entry level business machine with the Lisa the high-end business machine. A major new advertising campaign will be launched to project this strategy.

Timex/Sinclair sales drop

The sales of the Timex 1000 (*née* Sinclair ZX81), once the most popular home computer, have plunged and orders for its new 1500 and 2000 models are far less than projected. Timex, who pioneered the super-cheap home computer and led in the pricing battles, sold 550,000 units in its first five months. Sinclair had sold 150,000 ZX81s before turning distribution over to Timex. So far well over a million units have been made.

The 1000 has sold for as low as $27.95 and typically sells for about $45. The Commodore VIC 20, TI99/4A and Atari 400 which sell for only $30-40 more and offer colour, more memory, better keyboards and more features have hurt the sales of the 1000 and many retailers have abandoned the unit. Even the Timex 1500 which typically sells for about

SHARP MZ 700

CHECK THE FEATURES
64K RAM
INBUILT CASSETTE
4 COLOUR GRAPHICS PLOTTER
INBUILT PAL MODULATOR
LARGE RANGE OF SOFTWARE INCLUDING
PASCAL, GAMES AND HOME ACCOUNTING
5 COMPLIMENTARY GAMES
FROM ONLY $499.00
WE KNOW COMPUTERS
CALCUTRONIC PTY LTD
CALCULATOR AND COMPUTER CENTRE
797 GLENFERRIE ROAD, HAWTHORN 3122
Telephone: (03) 818 6631

What's the big deal about self-cleaning disks

★ Fits all current Mini-Disk drives
★ Permanent self-cleaning
★ Formatted for immediate use
★ Special BASF magnetic coating
★ Resistance and durability
★ Individually tested

STOCK UP FOR CHRISTMAS
5¼" Single Sided Diskettes
$3.40 Including Sales Tax
Postage $2.50

Name .....
Address .....
Bankcard No .....
Expiry Date ..... Signature .....

BASF
CPM DATA SYSTEMS PTY LTD
184A BARKLY STREET, FOOTSCRAY 3011
Telephone: (03) 687 6790

BRAND NEW RELEASE 2-1-84

MICROTRON COMPUTERS

Super 7
Personal Computer

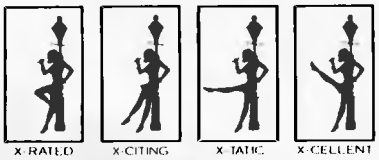
4K System ROM, Plus Sockets for 8K additional user ROM. Built in Disk, Printer Interface Game Socket

Lowest Price for Apple™ Compatible Peripherals, Disk Drives, Large Range of Interface Cards, CP80 Printers, Joysticks, Keyboads, Monitors, Floppy Disks, Books, Main Boards

MICROTRON COMPUTERS
18 Kenny Street, Wollongong 2500
Telephone: (042) 280811 till 6.30
DEALER ENQUIRIES WELCOME

™ Apple is the registered trademark of Apple Computers

HANDS ON OR HANDS OFF
FOR APPLE*, ATARI*, TRS-80*



PROGRAMEROTICA
OR JUST PLAIN DIRTY

Some Samples:

ABUSE
DO YOU CARE?
STRIP SEARCH
WANNA PLAY
PORNOPOLY
ENCOUNTER
BEDTIME STORIES
STRIP POKER

* MAIL ORDER ONLY
Prices range from **$25** to **$50** (approx)

* Apple is reg Trade Mark of Apple Computer Co.
* Atari is reg Trade Mark of ATARI INC
* TRS-80 is reg Trade Mark of TANDY ELECTRONICS

Send S.A.E. to. **PHILTH PROGRAMS** for listing
P.O. BOX 743,
FRANKSTON,

YANKEE DOODLES

$80 does not stack up well against these units. And the model 2000 is facing stiff competition from the Commodore 64 and Atari 800 which have better keyboards, graphics and sound.

Timex has therefore begun selling its systems to direct mail order companies and to companies who will sell the unit packaged with encyclopedias and textbooks. Also the units are being offered by banks and real estate developers as give-aways.

Commodore news

Commodore, which now has about 30% of the home computer business, is currently king of the home market-place. It has sold over a million VIC 20 machines, which typically sell for $70 a piece. This unit is expected to be phased out shortly and the model 64 dropped in price. The 64 has become the mainstay of the Commodore line since the company reportedly makes a profit of about $110 on each unit sold compared to only $20 on the VIC 20. Thus, although less 64s are sold it provides much greater income. Commodore has also discovered that most people who buy the 64, which typically sells for $200, also buy a disk drive for another $275, on which they make about $160. Commodore has disclosed that it has sold 500,000 64s since it came out late last year compared to the one million VICs sold over a two year period.

Coleco announcement

Coleco, the only game-maker currently making a profit, showed its Adam integrated home computer in June promising delivery in late August. It then pushed the delivery date back to early October and raised its suggested retail price from $600 to $700 (the dealer price will be about $525). The final unit will have a tape recorder for mass storage and a slow speed daisywheel printer. A modem, memory expansion and disk drive options are expected early next year. Also, Coleco expects an option which will increase the current 32 character line to 80 characters on a TV.

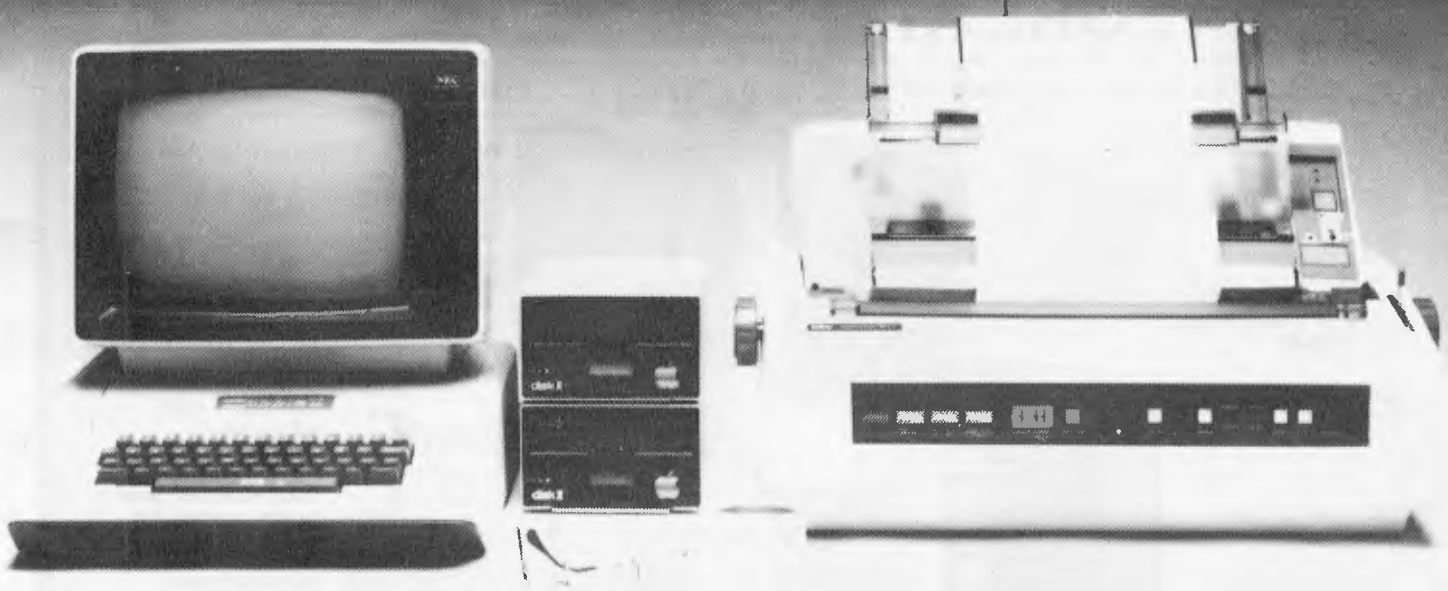
Coleco also disclosed that it has signed an agreement with StarCom to market its 'Dragon's Lair' arcade game that employs a laser disk and a new dimension in game technology. Coleco has also signed an agreement with AT&T to develop a home video game service via telephone. AT&T will make and sell the video game machine that includes a modem.

Research cooperatives begin projects

The Semiconductor Research Cooperative, a subsidiary of the Semiconductor Industry Association, disclosed that it is initiating development of a pilot program to demonstrate the manufacturability and reliability of a 4-Megabit memory device. SRC is an alliance of 18 companies including IBM, GE, Motorola, CDC, DEC, Intel, AMD, HP, Silicon Systems and Monolithic Memories. SRC was formed two years ago.

The Microelectronics & Computer Technology Corp., (an R & D venture owned by AMD, Allied Corp, CDC, DEC, Harris, Honeywell, Martin Marietta, Mostek, Motorola, National Semiconductor, NCR, RCA and Sperry), has announced that it will be doing research in advanced computer architecture, computer-aided design and manufacturing, system and circuit chip packaging and software technology. END

Just for apple



Computer Galerie, one of Australia's first Apple dealers, offers a depth of knowledge – and a better price!

You may choose from this huge range of Apple products. Please use this list as an official reference for comparison. These are suggested retail prices including sales tax. To calculate the education price divide by 1.2.

APPLE // SYSTEMS	
Apple //e 64K System	2050.00
APPLE // PERIPHERALS	
Disk // – Drive only	594.00
Graphics Tablet w/Interface	1194.00
Manitar // (12"Green)	399.00
Daisy Wheel Printer (DWP)	3152.00
Disk // Interface	216.00
Dot Matrix Printer (DMP)	1068.00
APPLE// INTERFACE EXPANSION CARDS	
IEEE-488 Card	565.00
Parallel Interface Card	239.00
Apple //e 80 Column Text Card	198.00
Apple Extended 80 Column Text Card	467.00
Super Serial Card	276.00
APPLE // ACCESSORIES	
Multi-Strike Ribbon DWP	16.80
Printwheel, Prestige Elite	21.00
Printwheel, Courier 10	21.00
Printwheel, Gothic 15	21.00
Printwheel, Boldface	21.00
Apple // Stand	72.00
Hand Controllers //e	56.00
Joystick //e	96.00
Numeric Keypad //e	253.00
LANGUAGES AND OPERATING SYSTEMS	
Apple Pascal	213.00
Apple Pilot	180.00
DOS Tool Kit	119.00
Apple Fortran	275.00
Apple Co-Pilot	65.00
Apple Superpilot	317.00
CIS Cobol with Forms-2	1434.00
Hand Holding Basic	90.00
Apple Logo	235.00

BUSINESS	
Apple Plot	119.00
Apple // Business Graphics	295.00
Quick File // (For //e only)	157.00
VT-100 Emulator	99.00
Script //	270.00
Senior Analyst //	390.00
Business Forecast Model	190.00
Dbase II	950.00
DB Master	380.00
DB Stats Pack	160.00
Executive Briefing Syst.	312.00
1st Class Mail	105.00
PFS IIe	175.00
PFS Graph IIe	175.00
PFS Report IIe	175.00
The Home Accountant	105.00
Versacalc 16	190.00
Versafarm	570.00
Versafarm Hardisk	726.00
Versafarm Pascal I/F	341.00
Visicalc	428.00
Visifile	428.00
Visischedule	528.00
Vistrend/Visiplot	528.00
SCIENTIFIC/INDUSTRIAL	
Applegraphics //	149.00
Data tree Data Base	197.00
Designer's Toolkit	355.00
EDUCATION	
Elementary, My Dear Apple, Education 11	53.00
Pilot Animation Tools	99.80
Speed Reader	129.00
Spelling Strategy	72.00
Math Strategy	72.00
Mop Town	85.00
Em-e's Quiz	85.00
Spotlight	85.00
Instant Zoo	85.00
APPLE // REFERENCE MANUALS	
Apple Reference Manual	29.95
6502 Hardware Manual	23.95
6502 Programmer's Manual	23.95
Basic Programming Manual	13.95
Apple Fortran Reference Manual	39.95
Pascal Operating System Manual	39.95
The DOS Manual DOS 3.3	23.95
Apple Pilot Language	29.95
Applesoft Tutorial For //e	39.95
Applesoft Programmer's Reference Manual	
Applesoft Manual Set for //e (3 Vol. Set)	79.29
CIS Cobol Manual (4 Vol Set)	150.00
Pascal Hands On	27.60
Apple in Depth S/W Catalogue	4.95
Software Binder	16.00
WORD PROCESSING	
Apple Writer //	270.00
Apple Writer // (For //e only)	295.00
Bank Street Writer	98.95
Powertext (Apple II)	268.00
Screenwritor II	193.00
Sensible Speller	213.00
The Dictionary	148.00
Zardox	324.00
GRAPHICS	
Animated 3D Combination	230.00
Bill Budge 3D Graphics	59.95
Graphic Magician	86.95
G.P.S Professional	164.00
Micropainter	54.95
Scientific Plotter	47.95
Visichart	139.00
Visiplot	343.00

COME AND COMPARE DISCOUNTS AVAILABLE

PERSONAL SHOPPER MAY NEGOTIATE A MORE COMPETITIVE PRICE ON OUR MONTHLY SPECIALS.

Computer Galerie is conveniently located in Mount Street Plaza at the rear of Galerie Books – Sydneys leading computer bookshop.

Open All Day Saturday **929 5497**

I need more Information & Prices.

Name .....

Telephone .....

Street .....

Suburb ..... Post Code .....

Industry .....

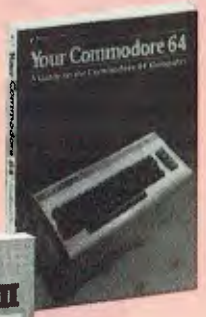
I need to do .....

Computer Galerie 66 Walker Street, North Sydney 2060.

NEW FOR XMAS!

GREAT BOOKS! GREATER SUPPLIER!

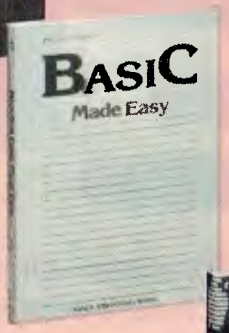
OSBORNE-McGRAW COMPUTER BOOKS FROM YOUR UNI CO-OP BOOKSHOP*



YOUR COMMODORE 64
Heilborn, Talbott
Master the use of your C-64 with this fully illustrated teaching guide. Packed with all the information you need to get your computer up and running, this guide includes step-by-step operating instructions for the C-64 and its peripherals, plus an introductory tutorial on programming in BASIC.
Price: $25.45

THE PROGRAMMER'S CP/M HANDBOOK
Johnson-Laird
An exhaustive coverage of CP/M 80, its internal structure and major components is presented in The Programmer's CP/M Handbook. Written for the programmer, this 750-page volume includes subroutine examples for each of the CP/M system calls and information on how to customize CP/M — complete with detailed source codes for all examples. **Price: $37.35**

USING dBASE II
Townsend
Here's a manual for business professionals who want to design customized programs with dBASE II software. Using dBASE II, provides you with a virtual encyclopedia of information, much of which is unavailable elsewhere.
Price: $32.25



MICROSOFT BASIC MADE EASY
Ettlin and Solberg
After reading Microsoft BASIC Made Easy, you'll be able to develop and document useful business applications programs to fit your special needs.
Price: $30.55

McGRAW-HILL'S HUGE RANGE OF COMPUTER BOOKS IS NOW AVAILABLE THROUGH ALL TWENTY BRANCHES OF THE UNI CO-OP BOOKSHOP*

THE ZX81/TS1000 HOME COMPUTER BOOK
Foyt
Learn how to operate these revolutionary low-cost computers while developing valuable programming skills. The author teaches you BASIC and you'll learn about computer graphics, animation and machine language techniques.
Price: $13.55

HOME COMPUTER SOFTWARE GUIDE
Ditlea
Choosing the right software is no easy task: it's crucial to know what's available, and to learn which software is best. **Price: $20.35**

54 VISICALC PROGRAMS
Flast
Manage investments, loans, taxes, and solve over 30 different stastistical and mathematical problems with this comprehensive collection of ready-to-use VISICALC programs. **Price: $27.15**

APPLE II USER'S GUIDE FOR THE II PLUS & THE APPLE IIe
Poole
This book is the key to unlocking the full power of the Apple computer. An extensive hands-on resource book this newly revised and expanded edition explains more about the Apple, the Apple II Plus, and the Apple IIe, than any other single source. **Price: $30.55**

*INSPECT THESE AT YOUR CLOSEST BRANCH

• TECHNICAL BRANCH 831 GEORGE STREET, SYDNEY PHONE: 211 0561 • 80 BAY STREET, BROADWAY, N.S.W. PHONE: 212 2211 • NSW INSTITUTE OF TECHNOLOGY • NSW UNIVERSITY • SYDNEY UNIVERSITY • ANU CANBERRA • WOLLONGONG UNI • CANBERRA CAE. • MACQUARIE UNI. RYDE • ARMIDALE UNI (U.N.E.) • NEWCASTLE TECH. • NEWCASTLE UNI. • RIVERINA CAE. (Wagga Wagga) • MITCHELL CAE. (Bathurst) • GRIFFITH UNI. (Qld.) • GIPPSLAND CAE (Vic.)

AVAILABLE BY MAIL ORDER!

☐ Please send me the following books by return mail

..... $ .....

..... $ .....

Less 10% discount if Co-Op member $ .....
Add postage: $1.50 N.S.W. $2.50 elsewhere. $ .....

Cheque/Postal Order enclosed $ .....

or Bankcard No. ..... Expiry .....

Send to:
UNI Co-op Mail-Order P.O. Box 54 BROADWAY, NSW. 2007

☐ Place me on your free mailing list for 12 months

NAME .....

ADDRESS .....

..... STATE ..... P/CODE .....

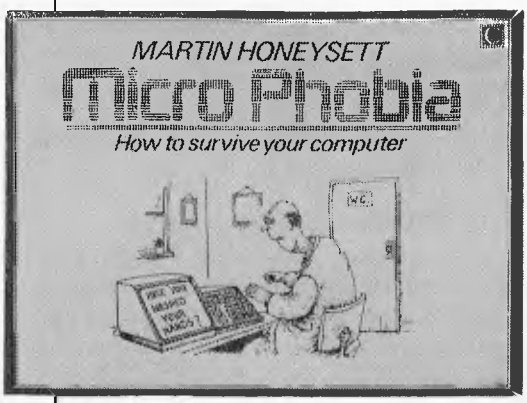
SIGNATURE .....

CO-OP MEMBERSHIP NO .....

APC 12/83

BIBLIOFILE

Once again Steve Withers has been weaving his way through the maze of computer books available.



Micro Phobia

Martin Honeysett's cartoons need no introduction to readers of *APC*, as they often grace these pages. Indeed several of the cartoons in this book have already appeared in *APC*, but Honeysett has also turned his attention to another aspect of the "technological revolution" — the video boom — so there will be something new in this collection for most readers.

Honeysett's work appeals to my sense of humour. He has the knack of taking an idea beyond the limits of the everyday world while maintaining the illusion of reality. For example, a garage machanic standing at the spare parts counter is being told by the computer-assisted storeman "It tells you the part number, whether it's in stock, and how many cuts and grazes you'll get trying to fit it".

Sometimes the cartoons have a sharper edge: one secretary is telling another "I'm all for computers, they do all the dull, boring jobs for you", while in the foreground we see a robotic caricature of a woman sitting on the boss's lap.

"Micro Phobia" would be an ideal stocking-filler for a computer or video buff.

Micro Phobia — How to survive your computer and the technological revolution.
Author: M. Honeysett.
Publisher: Century Publishing Co. Ltd., London.
Price: $4.95

Computers in Australia III

This book is actually the third report on computers in Australia by the Foundation for Australian Resources. The first section of the report is an absolutely fascinating history of computing in Australia, written by Frank Linton-Simpkins. Actually, his story begins in the early 1800's with an account of the pioneering work of Babbage and Countess Lovelace. The history of Australian computing apparently began in the forties with a defence-oriented research unit which spawned the team that would produce CSIRAC, Australia's first stored-program computer.

Linton-Simpkins guides the reader past a variety of milestones: the introduction of the IBM 360, the arrival of DEC and other minicomputer manufacturers, and "the microcomputer invasion". He also gives some insights into the activities of organisations like Telecom, the banks, and the Australian Computer Society.

Unfortunately, the remainder of the book is of much less interest to most *APC* readers as it is essentially an economists' view of the industry. The largest single section is "The History in Figures", a very dry collection of facts and figures about the computer industry in Australia. If you want to know the percentage increase in the number of computers employed in the mining and quarrying industries between 1970 and 1974, the answer is on page 111 (it's 280%, in case you are interested).

There is also "a study of the relationship between computer usage, profitability and manpower for major Australian companies" which (unless I misunderstood the report) seems to suggest that the only clear relationship is between "computer power" (as defined in the study) and profit, although the writers point out that the direction of the relationship is unclear — does installing extra computing power lead to bigger profits, or do large profits mean a company can afford more computers? In any case, extra computing power does not seem to increase either profit or sales per employee.

The final section was contributed by an economic consultant to the European Economic Community, who sets out some convincing reasons why Australia should increase its manufacturing sector rather than continuing to pay for imported finished goods by exporting raw materials.

REVEL

Here's the one the others

Hottest selling new home computer in UK and Europe – over 30,000 per month – and recently named Home Computer of The Year in France!

Today, you have the choice of more home computers than you can poke a stick at. And, it's fair to say that they all claim to be "the best" – to such an extent that you can't help wondering, "WHAT EVER HAPPENED TO TRADE PRACTICES?" Well, this is all about a computer for the first-time buyer that the others would rather you didn't know about. The Oric-1.

What you pay and what you get.

They'd rather you didn't know that the Oric-1 has up to 64K, yet costs from just $299. It would drive them round the bend if they knew that you knew that the $299 also bought you six true colours in addition to black and white. They'd be frothing at the mouth if you also knew that MICROSOFT® EXTENDED BASIC is part of the price, together with sound that's loud and clear (not just a muddy "bleep"). And they'd be on a guaranteed, one-way trip to the loony bin if they knew you knew the Oric-1 is backed by heaps of software and a 90-Day Warranty which is entendable to 12 months if you wish. There's more . . .

ORIC-1 plugs directly into the aerial socket of your TV.

It also has an RGB outlet if you require colour monitor quality. Text and graphic displays are ultra-bright, giving 40 characters of 28 rows. 8 foreground and 8 background colours can be displayed at any one time.

HIGH RESOLUTION GRAPHICS With Oric you have the choice of full Alpha Numeric computer standard character set, or TELETEXT (CEEFAX/ ORACLE) Alpha Mosiac graphics. The ORIC has, of course, Teletext/Viewdata compatible displays, plus the added bonus of being able to create up to 96 characters of your choice. Add to these features both flashing and Double Height characters and you can start to appreciate the full capability of ORIC-1.

SOUND The ORIC contains a high quality loud-speaker and a dedicated sound synthesiser circuit producing 6 full octaves of controllable sound.

For beginners, 4 programmed sound effects – SHOOT – EXPLODE – PING – ZAP – are available for games, simulations, etc.

You can even programme your own sounds using "SOUND, MUSIC and PLAY" commands, giving the user full control over the dynamics of the sound.

The Oric-1 comes with the 167 page Oric Programming Manual and special demonstration cassette.

ALL THESE KEY FEATURES:	
● MORE MEMORY AVAILABLE	✓
● EXTENDED MICROSOFT® BASIC	✓
● EXTENDED GRAPHICS	✓
● PROGRAMMABLE MUSIC AND SOUND	✓
● BUILT-IN SPEAKER	✓
● USES STANDARD CASSETTE PLAYER	✓
● LOADS AND SAVES 8 TIMES FASTER	✓
● 40 X 28 SCREEN SIZE	✓
● HIGH-RESOLUTION GRAPHICS	✓
● TV RF OUTLET	✓
● RGB VIDEO OUTPUT	✓
● PARALLEL PRINTER PORT	✓
● COLOUR PRINTER/PLOTTER AVAILABLE	✓
● SUPPORTS LETTER QUALITY DAISY WHEEL PRINTER	✓
● COMMUNICATIONS	✓
● TACTILE HIGH QUALITY KEYBOARD	✓
● AUTO-REPEAT ON EVERY KEY	✓
● FULL CURSOR CONTROL	✓
● SUPPORTS ORIC 3" MICRODRIVES	✓
● UP TO 1.6 MB OF STORAGE AVAILABLE	✓
● WIDE RANGE OF SOFTWARE AVAILABLE	✓
● INTERNATIONAL USERS' MAGAZINE	✓
● 90-DAY OR 12-MONTH WARRANTY	✓

Ask for details of the new Disk Drives, Printers and Communications Modems.

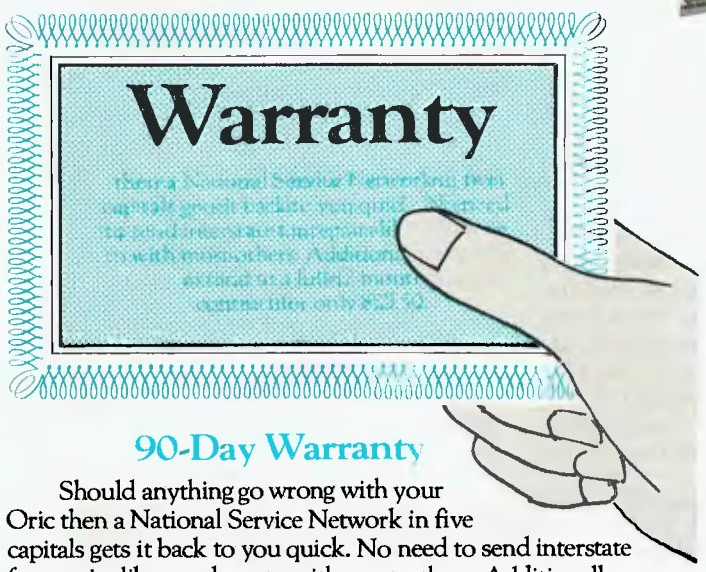
ATIONS

would rather you didn't know about!

The Oric Pedigree

ORIC-1 is superbly designed and engineered. Designed by a leading British team, the computing power of this micro is second to none in its class and offers superb value-for-money. ORIC is a major development in MicroComputer design and engineering, with a pedigree that means quality and reliability.

A National Service Network – every capital city – real back-up for you!



90-Day Warranty

Should anything go wrong with your Oric then a National Service Network in five capitals gets it back to you quick. No need to send interstate for repairs like you have to with most others. Additionally you can extend to a full 12 months contract for only $22.50.

Software Galore!

The Oric's incredible sales success in the U.K. and Europe resulted in a rush of activity by software designers. There is a big selection of programmes available and many more coming – covering a wide range of interests, including arcade, strategy, adventure and simulation games, education, programming aids, graphics, data base, word processing, financial spreadsheet and computer-aided design. Write for our free software listing – or see your Oric Dealer.

Special User Magazine

Once you're a proud Oric Owner, you'll want to receive this well-illustrated two-monthly magazine, showing how to get the best results and more satisfaction from your Oric, packed with information on new software and demonstrating programming techniques with examples. You'll also benefit from helpful comments made by other Oric owners.

NOW ASK YOURSELF THIS . . .?

- Can I buy better computer value?
- Who else offers so much usable memory at the price?
- Who else has so many features built in as standard?
- What other computer has such a marvellous range of programmes to help you get the most enjoyment and challenge from your system?

SPECIAL OFFER! Buy before 31st Dec. 1983 and bring this ad – you receive two software programmes (worth at least $45) at no extra cost

PHONE NOW FOR THE NAME OF YOUR NEAREST ORIC DEALER

(03) 8989533

and reverse charges.

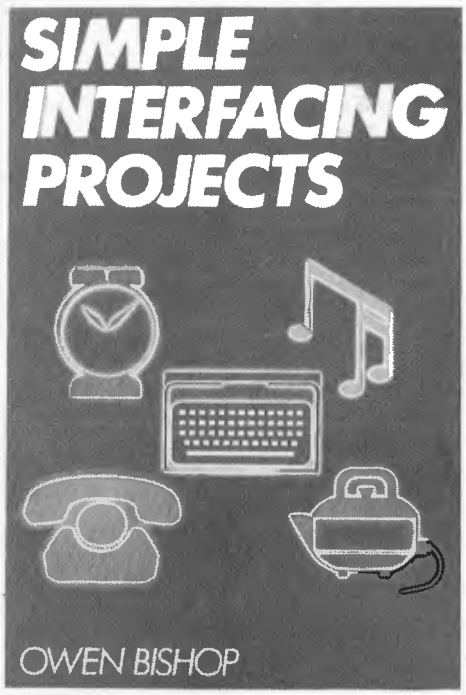
ORIC-1

ORIC COMPUTERS PTY. LIMITED
691 WHITEHORSE ROAD, MONT ALBERT,
VICTORIA, 3127. TEL: (03) 898 9533.

ORIC APC2

The problem with this book is that the various sections do not sit comfortably together. Each part is of value, but to different readers. Anyone interested in computers should enjoy reading the story of the Australian industry, and everyone should know what is likely to happen if we carry on importing manufactured goods; but the remainder of the report (well over half) will be useful or of interest only to a very much smaller audience.

Computers In Australia III — From computer usage to commercial success.
Author: B.S. Thornton, F.X. Linton-Simpkins, P.M. Stanley, G. Locksley.
Publisher: Foundation for Australian Resources, Sydney.
Price: $33.95



Simple Interfacing Projects

When I first became interested in microcomputing as a hobby, I spent a lot of time looking for a book that would lead me gently into the hardware side of things. As I was limited to working on the kitchen table with a soldering iron, a pair of pliers and not much else, I didn't want anything too sophisticated — in any case, there wasn't much cash left after paying for the computer, so the projects had to be simple. That book might have existed, but I never found it.

Now "Simple Interfacing Projects" turns up, and it is just what I was looking for. To start with, it doesn't assume that you will be using any particular type of computer — the projects are generalised so that they may be connected to a parallel i/o port (some designs only require a few bits of i/o, so a full port is not essential), or wired into the micro's address and data buses. Appropriate techniques are described to help the beginner who by necessity or design chooses the latter method.

I was intrigued by the design for a graphics tablet, which uses a jointed arm with potentiometers at the joints which are used to measure the position of the stylus mounted at the end of the arm. In addition to the constructional details, the author gives some programming hints along with a description of the maths involved in converting the angular measurements to screen co-ordinates. The design for a digitiser pad is another way of achieving similar ends.

The voice-operated controller looks like a device that could provide a lot of fun. Sure, there would be a lot of work involved in developing the software for use with the controller, and I don't think it would ever give a micro a vocabulary of more than a few words, but who cares about that? On the subject of sounds, the book includes designs for a sound processor and a music generator.

There are a couple of projects involving mains voltages that I'm not sufficiently confident to attempt (a mains remote control system and a micro-controlled mains switch), and I don't think Telecom would be very happy about people building their own accoustic couplers.

One worry I have is that I did find a couple of typographical errors, one of which is in a circuit diagram. That particular error (at the top left of page 84) is easily spotted, but its effect would be to reduce my confidence in the rest of the book — if I were following a diagram which had a mislabelled IC pin, I doubt that I would every get the circuit to work. Publishers of books aimed at the novice have a particular responsibility in this respect.

The modest price of this book makes it pretty good value for the beginner, even if only a few of the 12 projects are actually constructed.

Simple Interfacing Projects.
Author: O. Bishop
Publisher: Granada Publishing Ltd., Sydney.
Price: $12.95

LAZING AROUND

Quickie

The total number of heads and arms, of horses and riders, in a stable is equal to the number of legs. What is the least number of horses and riders that there could be?

Prize Puzzle

Using each of the digits 0 through 9 once only, form the smallest 10-digit number that is exactly divisible by every integer from 1 to 12 inclusive.

Answers please — postcards or backs of envelopes only — to reach *APC* by January 13, 1984. Send your entries to *APC*, Lazing Around, Prize Puzzle December, P.O. Box 298, Clayton, Vic 3168.

Prize Puzzle September

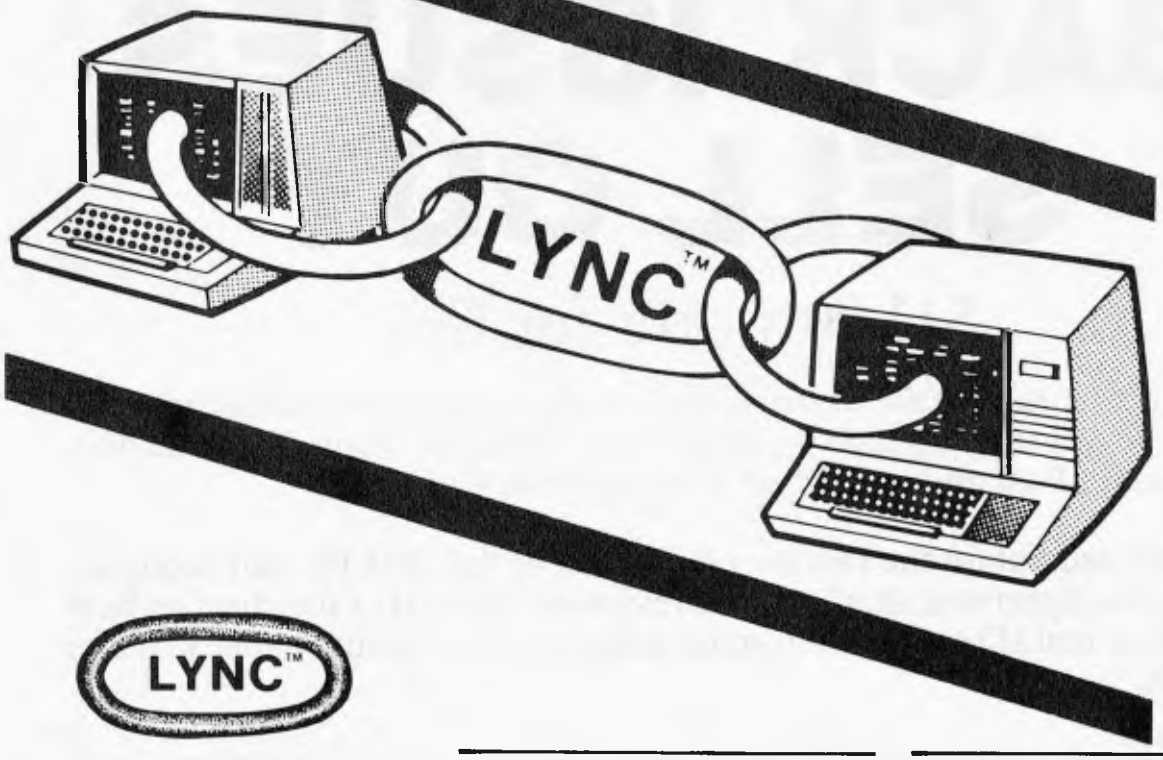
The September Prize Puzzle didn't present too many problems — as it happens there was quite a variety of solutions permissible. A lot of readers, however, seemed to miss the fact that within each family, the names had to be in alphabetical order during the countoff.

Only about 60 readers sent in entries, not all of them correct. I had great fun checking several of them on a Model 100 until I found a winning entry from G Thorpe of East Malvern. Congrats, your prize will be arriving shortly.

Mr Thorpe's solution, one of many was:

Adams	B	J	T
Baker	A	G	M
Chambers	B	L	P
Dawson	M	S	Y
Eastwood	F	R	T
Finch	C	M	S

Data Communications



★ IBMPC
★ SIRIUS
★ CPM80

LYNC™

Do you need to transfer source, object, or data files between microcomputers? Do you want to gain access to a timesharing mainframe? Or do you want to run your microcomputer from remote locations? If you need to perform any or all of these functions, then you need LYNC 3.0.

LYNC 3.0 is the most complete, easy to use, and flexible microcomputer communications program on the market today.

Compare these features:

LYNC 3.0 is Friendly

Great pains have been taken to insure that LYNC 3.0 is a friendly program. A long list of popular microcomputers and modems (including auto-dial/auto-answer modems) are on its installation menus. And its carefully documented custom installation program makes it easy to get others up and running. LYNC 3.0 even tests your serial port to insure that it is set up correctly.

This ease of use does not end with the installation. Most important, perhaps, the commands are simple and concise — and there is a HELP command to jog your memory if needed. You can set up a file of telephone numbers that you can refer to from LYNC 3.0 or, with an autodial modem, LYNC will automatically dial the numbers for you. You can even create files that will automatically log you on to timesharing systems.

LYNC 3.0 Moves Files

When LYNC 3.0 is in its Lync "mode" (and installed on both microcomputers), it will transfer files between machines running CP/M®, MP/M™, CDOS™, TURBODOS®, MDOS®, or MmmOST™. LYNC 3.0 allows you to send messages between the machines, display directories on both machines, and change the logical drives on both machines. Most important of all, you may send and fetch files with full error detection and correction. If desirable, one operator can control these operations on machines that are hundreds of miles apart.

The result: distant or incompatible microcomputers can easily work in tandom on a multitute of projects.

LYNC 3.0 Time Shares

When in its Term "mode", LYNC 3.0 allows you to use your microcomputer as an intelligent terminal when it is connected to most public and private mainframe computers.

While online, LYNC 3.0 allows you to communicate with a bulletin board or send (upload) files to the mainframe. You may also fetch (download) files from the mainframe and store (and/or print) them.

An XON/XOFF protocol can be used to ensure that no data is lost. And a fully automatic log on procedure makes it as easy as it can be.

The result: you can gain access to a world of vital information.

LYNC 3.0 Runs Remotely

When a microcomputer is running LYNC 3.0 in its Remote "mode", a standard ("dumb") terminal or another microcomputer may become its console with a simple control-X command (and optional password). Once logged on, a remote operator may perform all normal system operations and execute any accessible program (that is compatible with his terminal's video driver). Users in different rooms — or even in different states — can thereby take full advantage of the microcomputer's capabilities.

The result: your microcomputer can become the hub of an office- or business-wide computer system.

LYNC 3.0 Is a Value

LYNC 3.0 comes with an extensive manual that carefully explains how to install the hardware and software so that you may take advantage of all of LYNC's many features. If you utilize these features on your microcomputer, it will inevitably become a much more useful — and valuable — tool.

The result: at $200 for 3 programs in 1, LYNC 3.0 may be one of the best values on the software market today.

Minimum system requirements: (1) Z-80 based computer running CP/M, MP/M, TURBODOS, MmmOST, CDOS, or MDOS; (2) 20K RAM; (3) One disk drive; (4) RS-232 Serial Port.

When ordering, please specify 8" single-density or 5¼" diskette. If you order LYNC on 5¼", please also specify your computer system.

deForest Computers

26 Station Street, Nunawading, Victoria 3131.
(03) 877 6946 (03) 878 9276 Telex: AA30625

THE GREAT BACK ISSUES SELL OUT

$11.90 worth for free!

Just sign up to receive the next twelve issues of Australia's leading computer magazine in a tough, plastic wrapper delivered right to your door courtesy of Australia Post and we'll send you any 3 back issues!

If you missed out on the first ever Benchtest of the IBM PC, our scoop on the Sinclair Spectrum, that fantastic review of dBase II or the clues on how to produce real 3D on your computer's display, now's your chance to make amends.

Look through the issue by issue description of copies we've still got in stock. If you are interested in microcomputing it should read like a goldmine of information. But be quick — some issues are low on stock (where indicated). Send $35 to *Australian Personal Computer,* P.O. Box 298, Clayton Vic 3168 with combined subscription/back issues order form. It's $11.90 worth of back issues at no extra cost*.

**If you already have a subscription, send in your subscription/back issues order form anyhow and we'll extend your subscription by twelve issues as well as sending you three back issues.*

Volume 1 No 4, 1980
Benchtests: Hewlett Packard's HP85, Texas Instruments TI 99/4/Gateways to Logic Part 1: Teaching others about micros/Face to Face, Part 1: Life at the mun-machine interface/Adding a different family of chip to your micro/Random numbers — and how to generate them/Computer Games, Part 4: David Levy on speeding up tree searching/Book review: Alvin Toffler's "The Third Wave"/The Complete Pascal, Part 4: Data types, arrays and sets/Programs: 3D Noughts and Crosses (TRS-80), PET Back-gammon.

Volume1 No 6, 1980
Benchtests: Commodore 8032, SuperBrain/Overview of chess machines and micro programs/Writing machine independent Basic programs/Printer review/Programs: Lunar Lander (TRS-80), PET Fighter Pilot, Apple Plotting, LPrint to Print utility (TRS-80), ZX80 Breakout, Graph (TRS-80).

Volume 1 No 7, 1980
Checkout:Super 80 hi-res board/Robotics discussed/Three micro tournaments reviewed/Computer Games: "Guessing the odds" in game programming/APC-80: First ever instalment/The Complete Pascal, Part 6: Records and Files/Speeding up TRS-80 pocket computer programs/Free format dialogues at the man-machine interface/Programs: TRS-80 Tarot, PET Bloobers, PEEK and POKE for Apple Pascal, PET Demolition, Superboard Bug Bypass, String Function (Microsoft Basic), Several Sorts (Microsoft Basic).

Volume 1 No 8, 1981
Benchtest: Atari 400 and 800/Benchmark timings for machines tested up to this issue/Developing a business program, Part 1/The Complete Pascal, Part 7: Procedures and Functions/Gateways to Logic, Part 3: How Computers Think/APC-80: single keyword entry/A look at a US company specialising in helping the handicapped/Formatted dialogues at the man-machine interface/Programs: Reading 'System' tapes into the System 80, Monster Multiplier (Apple II), Read-write routines without error (PET), Program formatter (for programs stored in ASCII).

Volume 1 No 9, 1981
Checkout: "The Last One" program generator/Multi-User Systems, Part 1: Introduction/Computer Games: Bluffing and psychology/Disks and disk drives explained/Recovering from a data tape disaster/Developing a business program., Part 1/APC-80: String execution and block moves/Introduction to machine language/Gateways to Logic, Part 4: Binary arithmetic/Ultrafast tape storage for the Superboard/The Complete Pascal, Part 8: "Top-down" design of large scale text formatting programs/Review of the Forth language/Programs: TRS-80 Target Practice, TRS-80 Four in a Row, PET Anagram, PET Obstacle Course, Minefield (TRS-80).

Volume 1 No 12, 1981
Benchtest: Bigboard/Multi-user Benchtest: MVT Famos & WP Benchtest: Magic Wand/How printers work/Mainframe chess

programs/Gateways to Logic, Part 5.2: Electronic Logic/TRS-80 Tiny Basic Compiler/What's Where in OSI ROM/Profile: Nigel Shepherd of Commodore/ Building Parliament House with a micro/Solar System simulation/ "Quarter-box" graphics on a PET/Single Key Keyword entry for the Superboard II, Part 2 (end)/Programs: PERT Replace, TRS-80 Demon Hunts, PET Chords, ZX80 Sliding Letters.

Volume 2 No 2, 1981
HP-85 Reviewed/EDP at the Spastic Centre of NSW/TRS-80 Tiny Compiler on larger memory machines/APC-80: Bill Anderson of ADE/Facing the Future by Barry Jones/User-defined formatting on the Apple/ Improving the Superboard II/ PET utility for replicating cassette files/Relocating OSI Basic-in-ROM/Programs: Bigboard Real Time Clock, APC-80 Alien Invasion, PET Radio Technician Course.

(Stocks in limited supply.)

Volume 2 No 3, 1981
Checkout: Sinclair ZX81/APC-80: Recovering lost programs, JUMP command (allows a GOTO "numeric expression")/ Building a Bigboard/Keystroke reduction for EDTASM users/ Sanders Printer reviewed/Profile of BS Microcomp/CP/M explained by Rodnay Zaks/The rapid bubble sort for the Apple/ Encryption for any Microsoft Basic/An imagined 6502 "Dream Machine" specs/Vectors explained on the Challenger IP/ Programs: TRS-80 flashing cursor and non-destructive backspace, Treasure Hunt (PET).

Volume 2 No 4, 1981
Benchtest: VIC-20, Tandy TRS-80 III/TRS-80 Monitor software compared/Computer Games: Backgammon on micros/Tree access routines explained/Gateways to Logic, Part 8: Peripherals/How Computers Communicate, Part 1: What is I/O?/ Profile Gary Bloom of the Computer Company/Part 1 of 2: Defining program specification needs/6502 Assembler in Basic/ Wordpower wordprocessor program for the PET/Programs: PET Arithmetic Test, Apple Mondrian.

(Stocks in limited supply.)

Volume 2 No 5, 1981
Benchtest: IBM Personal Computer, NEC PC8000/WP Benchtest: Spellbinder/Gate array design and firmware modules, an upcoming generation of chips/ Winchester hard disks explained by Rodnay Zaks/Computer Games: Poker on micros/Gateways to Logic, Part 9 (end): Typical teaching projects/ Artificial Intelligence/How Computers Communicate, Part 2: The I/O Bus/Storing alphanumeric records under CP/M/ Part 2 of 2: Defining program specification needs/Apple "booby trap" documented/Make PET disassembled programs more readable/Explaining the WAIT function for OSI and PET machines/Putting a bell tone onto the Superboard/Programs: TRS-80 Sailing Simulation, ZX80 Eldorado, PET Gomoku.

Volume 3 No1, 1982
Benchtest: Tandy TRS-80 Color/ Checkouts: Hitachi Peach, Sharp's Microtranslator, BBC Proton/Profile of Rodnay Zaks/ Sorting alphanumeric codes from disk to disk/Computer games:GO-MOKU on micros/ Generating Patterns with a computer, Part 3: The parallel interface/Review of Forth Language/A neat way to describe programs quickly and logically/ Speech Synthesis for the TRS-80s, System 80s, Part 1/Cassette utility for System 80 on Eprom/ An easy route to shape tables for the Apple/Rubik Cube Simulation for the Apple/How to implement "Turtle" graphics on an Apple/Programs: Get Simulation (Apple), Bug Bug (TRS-80), Cryptography (Microsoft Basic).

Volume 3 No 2, 1982
Checkout: Apple III/Fitting a smooth curve to complex data plots/Speech synthesis for TRS-80s, System 80s, Part 2/"Bridge" on micros/Relocating assembly language programs/Binary sort explained/Programmable rhythm generator project for PET/Large number calculations on micros/ Basic interpreters explained/ Checkout: ZX81 printer/APC-80 overview and debounce routine/Storing arrays on tape/ Frames of Reference, Part 1: A DP manager's guide to micros/ How Computers Communicate, Part 4: The IEEE interface/ Overview of microcomputer databases/Programs: TRS-80 Alien Seahattle.

Volume 3 No 3, 1982
Benchtest: Hewlett Packard HP-125/WP Benchtest: Scripsit 2.0/ Checkout: Dick Smith Votrax Type 'N Talk, The Australian Beginning/Videotext overview/ Frames of Reference, Part 2: Hardware and Software Suppliers/Profile: Jim Warren of the West Coast Computer Faire/How Computers Communicate Part 5: The BCD Interface/Installing hires on the TRS-80/Bridge playing program reviewed/Programs: Galacti-Cube (3D Maze in fairly "standard" Basic), PET Fantasy, ZX80 Labyrinth, PET Juggle.

Volume 3 No 4, 1982
Benchtest: Osborne 01, Micro Bee/APC-80: Command mode syntax error recovery/How Computers Communicate Part 6: The RS232 interface/80 x 24 display controller project/Preview of the Commodore 64/Atari 400 games reviewed/Profile: Adam Osborne/ ANS Basic's features/Solving the hidden surface problem in 3D graphics/Frames of Reference, Part 3: Micros in mainframe company/Hewlett Packard's networking capability/Programs: TRS-80 Reaction Timing, ZX81 Graphiplot, PET Cheese, Superboard Spin-Fighter, TRS-80 Extra.

Volume 3 No 5, 1982
Benchtests: Texas Instruments TI 99/4A, Xerox 820/Database Benchtest: FMS-80/TRS-80 Model I games reviewed/Frames of Reference, Part 4: Software standards/How Computers Communicate, Part 7: Interrupts in micro systems/How to use 3D graphics/Equation solving program/80 x 24 display controller project, Part 2/"Logo" Overview/ Printer survey/Casio's calculator printer/Programs: TRS-80 Double Precision Maths and Trig, Apple 3D Maze,Atari Sums for Kids, Apple Air Flight.

Volume 3 No 6, 1982
Benchtests: Sinclair ZX Spectrum, Sirius 1/Database Benchtest: dBase II/7th West Coast (micro computer Faire)/ Checkout: F-10 Daisywheel printer, Arfon Expandaboard/ How Computers Communicate, Part 8: Direct memory access/ Frames of Reference, Part 5: Buying micro hardware in a DP department/Self learning program/80 x 24 display controller project, Part 3 (end)/How to get more on Apple disks/Lisp — an artificial intelligence language/ VIC-20 games reviewed/Implementing CP/M system calls from Microsoft Basic/APC Subset (first on new monthly column for assembler language routines)/ Programs: TRS-80 Invader, PET Mini-animate, VIC-20 Trailblazer, ZX81 Book Index, Wechug Monitor (TRS-80), VIC-20 Large Characters.

Volume 3 No 7, 1982
Benchtests: Sharp MZ80B, Monroe OC 8820/Checkout: Sharp PC1500, The Micro-Professor/Apple II games reviewed/APC-80: Various PEEKs and POKEs explained/ Reversing images on computer screens/Frames of Reference, Part 6: Putting your micro to work/How Computers Communicate, Part 9: Character codes/Educational arcade-type game/Programs: ZX81 Hypocycloids, TRS-80 Truth, PET Doc, TRS-80 Screen Dump, PET Boxes, Atari Earth.

Volume 3 No 8, 1982
Benchtests: Sord M25/Checkout: TEC SM-80/N CC Show Report/Sirius Graphics/ Advanced graphics techniques/ UCSD p-System overview, Part 1/IBM PC users talk/Taxonomic classification on an Apple/How Computers Communicate, Part 10: The software of I/O/ Abbreviated execution version of APC-80/RS232 overview, Part 1/ Checkout: Apple II Screenwriter/ Programs: TRS-80 Quadrangle, pET Mopup, Randomization Tests (ZX81).

Volume 3, No 9, 1982
Benchtest: ICL Personal Computer/Checkout: E-80(CP/M data compression utility) Daiswriter printer, HP 11C & 12C calculators/BBC micro graphics capability/Best of APC's cartoons/ How to use Benchmarks/Logo Program (Microsoft Basic)/Computer generated textures/RS232 overview, Part 2/Memory-saving utility for Apple/How Computers Communicate, Part 11: Interrupts and buffers/Programs: System 80 Extended Basic, Apple Trees, ZX81 Alphabetising, PET File Companion, PET German Game.

Volume 3 No 10, 1982
Benchtests: Hewlett Packard HP-86, National Panasonic JB3000/ Checkout: Sharp PC-1211/UCSD p-System overview, Part 3 (end)/ How to implement 3D graphics on a micro/CP/M-86 vs MS-DOS: Relative merits of these 16-bit operating systems discussed/ Designing your own database/ Monitor for TRS-80/System 80/ File searching method/"Laws of Form" — a novel form of logic/ How Computers Communicate, Part 12 (end)/Benchmarking high level languages/Programs: TRS-80 Crashshuttler, PET Knockout, PET Trains.

Volume 3 No 11, 1982
Benchtests: Hewlett Packard HP75C, Kaypro II, DEC Rainbow/Programs for the HP-41C and Casio fx-702p/Algebra checking program/More on MS-DOS vs CP/M-86/Predictions in the micro industry/Clocks/ calendar card for the Apple II, Part 1/Benchmarks summary/ Programs: Apple II Piano Computer, Moon Module (Apple II, correction in Vol 4 No 1), Walls (Atari, correction in Vol 3 No 12).

Volume 3 No 12, 1982
Benchtests: Epson HX-20/Database Benchtest: Cardbox/Checkout: E.T. Atari game, 80 column cards/Comparison of micro databases/Intelligence test for computers/Apple II clock card, Part 2 (end)/ "Ada" language overview/Tiny printing on a Centronics 739/Arithmetic program for the Sharp PC1211/ Programs: TI 99/4A Teepee Textpro, PET Firebird, Atari Colour Selector.

Volume 4 No 2, 1983
Benchtests: NEC Advanced Personal Computer, Commodore 64/Which Spreadsheet: Microsoft's Multiplan/Casio PB100 hand-held micro reviewed/ Screen-play: VIC-20 games under the spotlight/A visit to the Hanover computer faire/Checkout: Microsoft MS-DOS2/ Reliable Code: Programming tips/An introduction to the artificial intelligence program, LISP/Linking up a System 80 to a Tandy Lineprinter/Programs: Bricklayer (CBM 4032), Escape Maze (Atari 400/800)

Volume 4 No 3, 1983
Benchtest: Corvus Concept, IBM 9000/Checkout: IBM PC vs Columbia MPC, IBM vs Hitachi Success/Visi-On and Apple's Lisa compared/Visi-On: Visicorp's new general purpose program/ CP/M '83: The first software product exhibition/Transforming unused RAM into pseudo disk drives/Pascal Benchmarks/ Eprom/RAM board for the TRS-80/System 80/Direct graphics entry for the TRS-80/System 80/ Networks: Part 2/The Consumer Electronics Show review in Las Vegas/Portable Computer World: Hexadecimal madness/Programs: Atari Animatium.

Volume 4 No 4, 1983
Benchtest: Dick Smith VZ-200/ Spread Sheet evaluations: Part 1/ Checkout: 1st APC Show/A look at 'C'/Networks: Part 3/Building your family tree on a micro/Low-cost System 80 memory expansion/Micro users get the upper hand: Pascal Benchmarks explained/How dentists can use micros/Programs: PET Billy (correction in Vol 4 No 6 Bludners), ZX81 Molecular Weight, Adventure in 1k, TRS-80 Word Scrambler.

Volume 4 No. 5, 1983
Benchtests: NEC Advanced Personal Computer, Commodore 64/Which Spreadsheet: Microsoft's Multiplan/Casio PB100 hand-held micro reviewed/

Screen-play: VIC-20 games under the spotlight/A visit to the Hanover computer faire/Check-out: Microsoft MS-DOS2/ Reliable Code: Programming tips/An introduction to the artificial intelligence program, LISP/Linking up a System 80 to a Tandy Lineprinter/Programs: Bricklayer (CBM 4032), Escape Maze (Atari 400/800).

Volume 4 No. 6, 1983
Benchtest: Texas Instruments' Professional/Checkouts: Comx 35 home computer, NEC's Spinwriter daisywheel printer/ Multi-Tool Word wordprocessor from Microsoft/Occam Occult: futuristic new language/The world of creative cross-figures/ MicroBee games reviewed/Are micros a good idea?/Programs: Construction Worker (System 80, TRS-80), Chicken Little (Micro-Bee), PET Zombies, Spectrum Blaster, Commodore 64 Sprite editor.

Volume 4 No. 8, 1983
Benchtests: Apple Lisa, DOT/ Checkouts: Osborne Executive, Epsun FX-80 printer/Consumer Electronics Show Report/Will the Computer be the next dominant species on Earth/Milton Bradley's chess computer that moves its own pieces/Choosing suitable disks for your computer/ Cryptography on a micro/ Warnier Orr structured programming, Part I/How to use the six function keys on the PC1500/ Programs: ZX81 Least Squares, System 80 Loading tapes from an external cassette player, TRS-80/ System 80 Adventure program, Apple II Pascal menu generation.

Volume 4 No. 9, 1983
Benchtests: Sord M5/Checkout: Tandy Model 100, Lisawrite/ Screenplay: TI 99/4A games/ Steve Wozniak returns to Apple/ Choosing a home micro/Warnier Orr programming, Part 2/Graph plotting and curve fitting on the BBC Computer/Bemoaning the mechanical teller/Programs: VIC-20 Snake line, ZX81 Surround, Apple II Screenplay, PET Histogram.

Volume 4 No. 10, 1983
Benchtests: Archives PC/Home Computer Survey — 15 micros selling for less than $1000 checked out by Steve Withers in an exhaustive market survey/ Checkout: Simons Basic, T/Maker III — office tool for the IBM PC, Digital Research Personal Basic/Computerising Your Business — a light and practical guide/Beginners Guide to Basic Program Conversion/ Clever trick with TI Sprites/ Cocktail program/Warnier Orr programming, Part III/How portable is portable/Programs: Atari No-Trons, TRS-80/System 80 Multi-Maths, Apple Text Maker, VIC 20 Spider, Commodore 64 Sprite Clock.

SUBSCRIPTION/BACK ISSUES ORDER FORM

Please supply the following back issues free with my subscription for one year (12 issues).

Vol. 1 No.*	☐ 6	☐ 7	☐ 8	☐ 9							
Vol. 2 No.*	☐ 2	☐ 3	☐ 4	☐ 5							
Vol. 3 No.*	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10	☐ 11	☐ 12
Vol. 4 No.*	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6/7	☐ 8	☐ 9	☐ 10				

*Volume 1 Nos. 1, 2, 3, 4, 5, 10, 11 & 12, Volume 2 No. 1 and Volume 4 No. 1 are unavailable.

I enclose my cheque for ☐ $35.00 within Australia
☐ $A45.00 N.Z. and Papua New Guinea

Please charge my Bankcard. Bankcard No.....

Expiry Date..... Signature.....

Name.....

Address.....

..... Postcode.....

IDIAK II — FAST CP/M 2.2 COMPUTER

COLOSSAL 2.8 MBYTES BETTER THAN 8" SPEED AND CAPACITY

★ FEATURES

- Faster than 8" Disk Systems
- 1.4 Mbytes Formatted per Drive High Double Density Double Sided
- Z80A 4MHz CPU
- 64K RAM
- 2 x RS232 I/O Ports
- 1 x Centronics Port
- 2 Slim-line 5¼" Drives (Optional 1 Drive)
- Interfaces to terminal or to your personal computer acting as terminal
- Includes CP/M 2.2 Software

EXCELLENT VALUE!

IDEAL FOR BUSINESS OR SERIOUS HOBBYIST

Computer Prices:

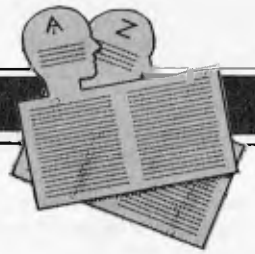
$1999	2 Disk Drive	IDIAK II
$1450	1 Disk Drive	IDIAK II
$ 590	1 Drive Upgrade Kit	

(sales tax, pack & post included)

Accessory Prices:

10	High density Disks	$110
1	High Density Disk	$ 12
1	Centronics Cable	$ 45
1	Terminal Cable	$ 40
	Pack & Post	$ 2

IDIAK COMPUTER PRODUCTS 10A Bannister Street, Fremantle, 6160, W.A.
P.O. Box 694, Fremantle, 6160, W.A.



USER GROUPS INDEX

Below is a complete list of user groups known to us in Australia and New Zealand. Users Groups' Secretaries are asked to provide us with alterations, additions and corrections as promptly as possible to avoid a longer than necessary delay before publication. During the next four months, these changes will be published and the next complete listing will appear in the May 1984 issue of APC.

NEW SOUTH WALES

COMMODORE USER GROUP
For more details contact Mr John Guidice, C/- The Commodore Users Group, G.P.O. Box 4721, Sydney 2001.

AUSTRALASIA ZX80 USERS GROUP
Anyone interested in the ZX80 may contact Tony Mowbray, 87 Murphys Avenue, Kieraville, 2500. Phone: (042) 28 5296.

MICROBEE USER GROUP
The Albury/Wodonga District MicroBee User Group can be contacted at 202 Koobe Street, Albury 2640. Phone: (060) 25 1601 and ask for Eric Eulenstein.

NEWCASTLE 80 MICRO USERS GROUP (NMUG)
Meetings are on the last Wednesday of each month at the hall on the corner of Fowler and Ogden Streets, Hamilton South, NSW. Contact Dennis Jackson on (049) 68 1910.

AUSBORNE USER GROUP
The Sydney based Osborne user group publishes a monthly newsletter and has an 80 diskette library available to members containing utilities, games, application programs, system patches, etc. For further information contact Ian MacCulloch on AH (02) 81 1908 or write to P.O. Box C530, Clarence Street, Sydney 2000.

HUGAM
The Hunter Users Group — All Microcomputers — meets at the University of Newcastle, Room W308 of the Education building on the second Wednesday night of each month at 7.30pm. The group produces a newsletter and further information can be obtained from The Secretary HUGAM, P.O. Box 39, Broadmeadow 2292.

80AT
Mail enquiries to 80 AT, C/- Planet 3 Systems, 47 Birch Street, Bankstown 2200.

SYDNEY PEACH USER GROUP
The contact address is 261 Northumberland Street Liverpool 2170 or, for more information telephone Ben Sharif on (02) 707 2466 (BH), (02) 36 4825 (AH) or Esther on (02) 601 8493 (BH).

PEACH USER GROUP
The New South Wales Peach User Club holds weekly meetings on Saturday at 2pm at Cybernetics Research, 120-122 Lawson Street, Redfern. The Club offers memberships at $10 for a six month period which entitles members to newsletters, access to the Club software and technical library, and technical advice.

MEGS
The Microcomputer Enthusiasts Group meets on the third Monday of each month at the Wireless Institute Australia Hall, 14 Atchison Street, St Leonards at 7pm.

A Sharp MZ 80B User's Group has just been formed and is looking for additional information. Contact Stephen Bannerman on (069) 62 5594 or write to P.O. Box 815, Griffith 2680.

A computer club has been formed in Deniliquin, New South Wales. The club meets the first Sunday of each month at The Airport Sewing Centre, 139 Davidson Street, Deniliquin. For information contact Wayne Patterson on (058) 81 3014.

FORTH GROUP
On the 25th of March the Sydney Forth Group was established. The Group will meet on the second Friday of the month at 7pm in Room LG16, Morven Brown Building, University of New South Wales. The Group promotes FORTH a new computer language and listings for languages available for most processors. For further information contact Peter Tregeagle, 10 Binda Road, Yowie Bay 2228. Telephone: (02) 524 7490.

The APF Users Group has been formed and is looking for additional information, etc. Contact Norm McMahon on (02) 44 2645 or write to 288 Kissing Point Road, Turramurra 2074.

WOLLONGONG COMPUTER CLUB
For more information call Paul Janson, 14 Hoyward Street, Kanahooka on 61 5451.

TI-99/4 HOME COMPUTER USER GROUP
Contact Brian Lewis, P.O. Box 149, Pennant Hills, NSW 2120. Telephone: John (Secretary) (02) 848 0956.

MACARTHUR COMPUTER USERS ASSOCIATION
This group has been formed for members of the Campbelltown and surrounding communities who are interested in computing whether on micros, minis or mainframes. They meet on the first Monday of each month. The President is Mr C Wylie, 85 O' Sullivan Road, Leumeah 2560. Telephone: (46) 26 1625.

THE BLUE MOUNTAIN COMPUTER CLUB
Meetings are held at the Springwood Civic Centre on the last Friday of each month at 7.30pm. For further details contact Eric Lindsay, 6 Hill Crest Avenue, Gaulconbridge. Telephone: (047) 511 044 (BH) or Greg Baulman on (02) 648 5342.

ILLAWARRA SUPER 80 USERS GROUP
The group was formed in January of last year and meets on the first Monday of each month commencing at 5.30pm at the Australian Offices, 86 Market Street, Wollongong. The postal address of the group is P.O. Box 1775, Wollongong 2500.

APPLE USERS GROUP
The A.U.G. meets at the Sydney Grammar School Science Auditorium on the second Monday of every month at 6.30pm. The group maintains an expanding software library on disk and publishes a monthly newsletter called 'Applecations'. Further enquiries to A.U.G. (Sydney), P.O. Box 505, Bankstown, NSW 2200 or to The Secretary, Colin Rutherford on (02) 520 0926.

Illawarra Apple Core meetings are held on the fourth Monday of each month at Holy Cross College, Bond Street, Bellambi at 8pm. For further information contact Bob Williams on (042) 96 6115.

NORTHSIDE MICROBEE USERS GROUP
Meetings are held on the third Saturday of each month at the McMahons Point Community Centre in Blues Point Road, North Sydney from 1 to 5pm. The President is Colin Tringham of 6 Tunks Street, Waverton, 2060, telephone 92 6408 and the Secretary is Tony Williams, 3/125 Kurraba Road, Neutral Bay 2089, telephone 909 3951.

A Commodore VIC-20, C64 and PET computer user group meets on the first Tuesday of every month in the Ellis Room of the Newcastle Technical College at 7pm. Further information is available from Geoff Rayner on (049) 43 3352. His address is 8 Kulai Street, Charlestown 2290.

The Newcastle Microcomputer Club meets on the second and fourth Monday of each month at 7.30pm in Room G12 of the Physics Building at the University of Newcastle. Members own a variety of microcomputers and the club is not devoted to any particular brand of microcomputer. Anyone interested in further information should contact Angus Bliss on (049) 67 2433 or Tony Nicholson on (049) 52 6017 AH.

The Hawkesbury Microbee Computer Club meets at 7.30pm on the first Friday of each month at the Richmond Primary School (NSW). The club has thirty members and is running courses in Basic amd Z80 Assembly Language. More details are available from Bruce Rennie on (045) 67 7329.

USER GROUPS INDEX

VICTORIA

MICOM
The MicroComputer Club of Melbourne is a club catering for a wide range of computers and interests. MICOM can be contacted by writing to P.O. Box 60, Canterbury 3126. The Club meets on the third Saturday of each month at the Burwood State College on Burwood Highway from 2 to 5pm.

CPMUG
The CP/M User Group of Melbourne is a special interest group of MICOM for CP/M users. CPMUG meets at 8pm on the fourth Tuesday of each month at Hawthorn Community House, 39 William Street, Hawthorn. Further enquiries may be directed to MICOM.

PEACH USER GROUP OF MELBOURNE
A special interest group of MICOM for Hitachi Peach users. The group meets at 8pm on the first Friday of each month at the Templestowe Technical College, Cypress Avenue, Templestowe and also at MICOM meetings. Enquiries, MICOM or Greg Hudson on (03) 429 3216 (decent hours only).

GEELONG COMPUTER CLUB
Write to Geelong Computer Club, P.O. Box 6, Geelong 3220.

KAOS
Contact Ian Eyles, 10 Forbes Street, Essendon 3040. Tel: (03) 375 3478 (AH).

SHARP COMPUTER USERS ASSOCIATION
Meetings are held at the Burwood Heights High School, Mahoneys Road, East Burwood, Victoria on the second Friday of each month of the school year. The Association is a non-profit organisation with its main interest, at the moment, the PC1500/Tandy PC2 but the owner of any Sharp Computer is welcome to attend meetings.

BENDIGO VIC-20 COMPUTER USERS GROUP
The first meeting of the group was held on the 25th March in the library of the Bendigo Technical College, Macrae Street, Bendigo. The meeting resolved to meet every fourth Friday of the month in the library at 8.00pm. Office bearers were to be elected at the April meeting. For further details contact the Acting Secretary, Mr Bob Lukeis, 5 Board Court, Kangaroo Flat, Vic 3555 or telephone (054) 477 593.

FORTH INTEREST GROUP — AUSTRALIA
This club is the Australian chapter of the international FORTH Interest Group. Meetings are held on the first Friday of each month at 8pm. Contact The Secretary on (03) 29 2600 or write to P.O. Box 103, Camberwell 3124 for more information and a catalogue of books and software. To obtain a monthly newsletter from the Australian FORTH Interest Group (a separate organisation) send $10 to Ricchie Laird at 25 Gibsons Road, Sale, Vic 3850.

EASTERN SUBURBS 80 USERS GROUP
The group meets on the fourth Wednesday of each month (except August) at Kingswood College, 355 Station Street, Box Hill 3128. Starting time is 7pm. For more information telephone Cameron McKern on (03) 288 1713 (AH) or via MCCKCH-ESSURR on The Australian Beginning.

PENINSULA GROUP
This group meets at State College, Frankston on the second Thursday of each month except during January. Those interested should contact M.G. Thompson on (03) 772 2674.

MICROBEE USERS GROUP
Meets on the second Wednesday of each month at the Burwood Teachers College, Building E. Further information, contact Grant Forest on (03) 879 2257 or write to 10 Sunbeam Avenue, Ringwood East 3135.

COMPUCOLOR USER GROUP
Meetings are held on the 2nd Wednesday of every month at Panatronics, 691 Whitehorse Road, Mont Albert. For further information contact Neil Brandy on (03) 890 0579.

AUSOM
Apple Users' Society of Melbourne can be contacted by writing to AUSOM, P.O. Box 43, Forest Hill 3131.

Z.S.E.
ZX81 users can now contact the ZX81 Software Exchange by sending a S.A.E. to Z.S.E., C/-Chris Tueno, 5 Muir Street, Mt Waverley 3149.

S.M.U.G.
To find out more about this group of SORD M100 users contact Mr Robin Miller, 60 Winmalee Drive, Glen Waverley 3150.

CCC
The Color Computer Club meets every Friday fortnight in Geelong. It has a program library and produces a monthly newsletter and more details can be obtained from A. Gay, 3 Quamby Avenue, North Geelong 3215. Telephone: (052) 78 3424.

S.C.U.A.
Sorcerer Computer Users (Australia). Further details can be obtained from The Secretary, S.C.U.A., P.O. Box 144, Doncaster 3108.

VIC-20 MELBOURNE USER GROUP
Meetings are held on the 3rd Wednesday of every month at Panatronics, 691 Whitehorse Road, Mont Albert. For further information contact Neil Brandy on (03) 890 0579. Please 'Bring a Chair'.

THE NORTHERN AND WESTERN SUBURBS COMPUTER USERS GROUP
Meetings are held at CP/M Data Systems, 284 Union Road, Moonee Ponds, every second Thursday at 7pm. Anyone interested can contact David Coupe on (03) 370 9590 or Clive Budd on (03) 370 2917.

NSZXUG
The group caters for ZX80 (8k and 4k ROM), ZX81 and the Spectrum machines. Also produced is a small range of quality software and hardware for these micros. A catalogue of these items and membership details are included with the free introductory issue. Interested parties can obtain the newsletter by sending a 27 cent stamp to P.O. Box 148, Glen Waverley, Vic 3150.

BALLARAT COMPUTER USERS GROUP
Membership is $5.00 per annum to cover postage of newsletter. Meetings on the first Wednesday of each month at 7.30pm at a location known by John Preston on (053) 31 4363.

We reprint a letter received from Ross McKenzie of the Victorian Assqciation of Computer Educators:

"I am a member of the executive of V.A.C.E. We would like you to include our group in your list of User Groups, or in some other similar way. As I write we have over 170 member schools. The predominant interest group at present is APPLE but we are aware that with time this will, and must, change.

Our Secretary is' Arthur Tatnall, P.O. Box 69, Whittlesea 3757.

We are a school-based group and rather unlike other user groups in that we have few private members — only those in education who might otherwise be excluded.

Owners of RCA VIP, ETI 660, DREAM 6800 or the new Comx 35 micro are welcome to contact Frank Rees at 27 King Street, Boort 3537 for details of a user group. A newsletter is produced and the Chip 8, 6800 and 1802 languages are catered for.

M.A.C.E.
Melbourne Atari Computer Enthusiasts (M.A.C.E) has over one hundred members spread over Australia and publishes a monthly newsletter called the Australian Atari Gazette. Meetings are held on the first Sunday of each month at midday at 3M Australia, cnr of Blackburn and Ferntree Gully Roads, Mt Waverley. Contact MACE, P.O. Box 246, Northcote, Vic or phone (03) 481 2215.

A note from Kelvin Eldridge: "If you own an Atari 400 or 800 computer then contact me for information of the two Atari user groups that exist in Melbourne. Kelvin Eldridge, P.O. Box 173, Reservoir 3073. Telephone: (03) 470 5027 (AH)."

Kaypro Users Group is now operating in Melbourne. The next meeting is Sunday, 27th November 2pm, at the Australian Council for Education Research, 9 Frederick Street, Hawthorn. All are welcome. Newsletter available monthly for interstate users. Membership $20 per year. All enquiries to KUGVIC, P.O. Box 159, Forest Hill 3131, or 'phone (03) 857 5462.

8 PEN MULTI COLOR PLOTTER
at an affordable price

National

National

A-3 Type Digital Plotter
VP 6802A

1. MULTICOLOR HIGH SPEED PLOTTING

EIGHT COLOR GRAPHICS AT 450mm/sec (18 inch/sec)

The high plotting speed of 450mm/sec (18 inch/sec), the variety of pens (fiber, ball point, plastic tip) and colors allow great versatility in the creation of graphs.

2. SIMPLE PROGRAMMING

A VARIETY OF INTELLIGENT FUNCTIONS

The high level of intelligence built into this Digital Plotter greatly simplifies the programming required to generate the complicated engineering drawings or business charts.

3. RELIABLE PAPER SECURITY

ELECTROSTATIC PAPER HOLDING

The highly reliable, electrostatic paper-holding method guarantees secure paper holding, which is applied by simple switch operation.

4. QUIET MOVEMENT AND SAFETY

DESIGN CONSIDERATION ON MECHANICAL CONSTRUCTION AND SOFTWARE PLUS PROTECTIVE COVER

The detachable plastic cover assures durability and safety while suppressing the movement noise substantially.

5. CONTINUOUS PLOTTING

AUTOMATIC CHART ADVANCE "OPTION"

By combining the automatic chart advance option, this plotter can function in a tollaly unattended mode. This makes it possible to build up fully automatic drawing system which does not need any human care.

6. COMPUTER INTERFACES

THREE TYPES

Eight bit parallel, RS-232-C and GP-IB interfaces are able with VP-6802A. The above interfaces allow the plotter to be used as a computer graphics device as well as an instrumentation graphics device.

SCIENTIFIC DEVICES AUSTRALIA PTY LTD

2 JACKS ROAD, SOUTH OAKLEIGH, VICTORIA, 3167 PHONE: 579 3622
31 HALSEY ROAD, ELIZABETH EAST, S.A., 5112 PHONE: 2555 6575
35-37 HUME STREET CROWS NEST, N.S.W., 2065 PHONE: 43 5015

USER GROUPS INDEX

The Warragul Commodore Club meets at the Community Education Centre every Saturday afternoon. The group is particularly keen to contact other Commodore user clubs. Their postal address is Walkers Road, Number 1 Road, Warragul 3820.

A computer users group has been formed in the Mornington district. At present the group is operating under the name of 'Mornington Peninsula VIC-20 User Group', but it is intended to cater for users of all Commodore personal computers.

Meetings are held on the second Monday of each month at the Tanti Park Community Centre. Further information is available from Mr Angus Harding on (03) 783 3007.

A.C.T

MICSIG
Contact the Registrar, MICSIG, C/- P.O. Box 446, Canberra City 2601.

There have been a number of changes to details of the Canberra Micro-80 Users Group. The latest information is: The group caters for owners/users of the TRS-80s, System 80s and other Z80 based microcomputers.

It meets on the third Monday of each month in the small lecture theatre of Building J of the Canberra Technical College, Constitution Avenue, Reid at 7.30pm. Experts and novices are welcome.

Subscription is $12.00 per year and includes a monthly newsletter. Contact: Secretary (Milt Cottee), 33 Crawford Crescent, Flynn, (062) 58 2637 (AH).

BBC USERS GROUP OF CANBERRA (BUCG)
Meets on the last Wednesday of each month and welcomes all interested in the BBC Computer. Membership is free and details may be obtained from Steve MacLeod (062) 58 7719 or John Toms (062) 58 4052.

ACTAPPLE
This Apple user group meets on the second Thursday of each month. For more information contact Jeff Brock, Secretary/Editor, P.O. Box 1231, Canberra City 2601.

AUSTRALIAN ZX80 USERS ASSOCIATION
Contact can be made with the editor of the Club magazine, David Brudenall, 19 Godfrey Street, Campbell, ACT 2601.

SORCERER COMPUTER USERS OF AUSTRALIA (ACT BRANCH)
Interested persons may contact Mr G T Dick, 31 Creswell Street, Campbell, ACT 2601. Tel: (062) 48 7793 for details of membership and information on forthcoming activities.

A VIC-20 Users' Association has been operating for several months. It publishes a bi-monthly newsletter and distributes cheap software. For more information, including details of a monthly meeting, phone (062) 41 2316 or write to 25 Kerford Street, Watson 2602.

The Canberra A.C.T. Sirius User Group meets every third Tuesday of the month at 31 Altree Court, Phillip 2606. Contact Jim Bland on (062) 81 2824 or (062) 81 2832 for further details.

QUEENSLAND

QUEENSLAND SORCERER USER GROUP (QSUG)
Meeting are held on the last Sunday of each month at the Queensland University. Annual membership fee is $10. For more information contact G Snell on (04) 205 1017.

ASUG
Stephen Page has founded a national Sirius (Victor 9000) user group with free membership. Write to the Australian Sirius Users' Group, P.O. Box 204, Chermside 4032 or ring (07) 350 2611 for a membership application form.

TI-99/4 USER GROUP
Contact P.O. Box 396, Nundah 4012. Telephone: 263 4989 or 263 6161.

BRISBANE YOUTH COMPUTER GROUP
Mr A Harrison, P.O. Box 396, Sunnybank 4109 should be contacted for more information.

IREE MICROCOMPUTER INTEREST GROUP
Details on club membership etc may be obtained from the Secretary N Wilson, P.O. Box 81, Albion 4010. Telephone: 356 6176.

APPLE-Q
User Group days are held every third Sunday of the month (December excluded) at the Hooper Education Centre, Kuran Street, Wavell Heights. The Centre is open from 8.30am until 4.30pm and members are encouraged to bring their Apple along. Bar-B-Que facilities are also available for members staying all day.

Those interested in becoming members of Apple-Q should forward $18.00 subscription fee to The Secretary Apple-Q, The Brisbane User Group, P.O. Box 721, South Brisbane, Qld 4101. Apple-Q is affiliated with Apple Core.

COMPUTER OWNERS GROUP (COG)
Formed for people on the northern side of Brisbane, CIG has an emphasis on computer use and programming, rather than on electronics. The group produces a small monthly newsletter called "Cog 'n' Speil" and meets on the second Wednesday of each month. For more information telephone Betty Adcock on (07) 263 4268.

OHIO SUPERBOARD USER GROUP
For membership and newsletter information, please send a large S.A.E. to Ed Richardson, 146 York Street, Nunday 4012.

Anyone interested in forming a Jupiter Ace user group should contact Helge Nome, P.O. Box 183, Ravenshoe 4872.

The Southport Commodore Computer Users Group meets every Monday night at the Southport State School in Scarborough Street, Southport at 7pm. New members are welcome at any time. The President is Tony Gosling (075) 31 1680 and the Secretary is Bill Fitzpatrick (075) 32 0061.

COMMODORE COMPUTER USERS GROUP OF QUEENSLAND
Meets on the first Tuesday of each month at Construction House, 130 Petrie Terrace, Brisbane at 7.30pm. For further information call Bill Brown on (07) 349 6612 or write to P.O. Box 274, Springwood 4127.

The members of the PEACH COMPUTER USERS GROUP QUEENSLAND invite all MB6890 users to join their group (established 1 year) which meets every 4th Tuesday monthly at 7.30 at Taringa Primary School, Brisbane. The Group offers a software library, advice, tech sheets, information, brains trust support and more! Contact Leo Burke, President on 356 6080 or Glen Thwaite, Treasurer on 298 4341 with mail to Brian K Williams of 19 Patrick Street, Norman Park, Brisbane. Aust. Beg. User name WILL-PATRONORM.

The Townsville MicroBee User Group (T-MUG) meets at 7pm on the second Monday of the month with another 'user' meeting held later in the month. Meetings are held at Town & Country Computers, CTL Centre, Anne Street, Aitkenvale.

Anyone interested is invited to contact our President Chris Hayes (077) 79 6065 or our Secretary John Johnson AH (077) 79 5628.

HITACHI MB6890 ("Peach") AND MB16000 ("Success") USERS GROUP
Anyone interested please contact Mark or Jeanene Howard at 56 Peter Street, Strathpine, Queensland 4500. Telephone: (07) 205 4729.

The PC1500 Bit Fiddlers Club can be contacted on (07) 395 1952. The group is mainly of interest to those with PC1500 or PC2 calculators (computers) but any pocket computers are welcome. Contact address is C L Burke, 947 Creek Road, Carindale 4152.

The TRS-80/System 80 Users Group meets on the first Sunday of the month at Lindium Hall, commencing at 1.30pm. Phone enquiries can be made on 396 2998.

SOUTH AUSTRALIA

TRS-80 USERS GROUP
To obtain details contact Mr G Stevenson of 36 Stuart Street, Adelaide 5000.

BEEBNET
An Australian BBC and Econet Users Group has been formed which is looking for new members and software pro-

MICRO-EDUCATIONAL PTY LTD

FIFTH BIRTHDAY SPECIALS

17 PARK ROAD,
GARDEN SUBURB, NSW 2288

Phone: (049) 43 6805
(049) 43 0624

from AUSTRALIA'S LARGEST COMPUTER MAIL-ORDER SUPPLIER

AMUST DT-80 PRINTER
A Runaway success, selling 500 units per month!
NOW REDUCED BY **$100**

FEATURES:
Superb print quality . . . 80 cps bidirectional . . . bit image graphics . . . full descenders . . . italics . . . double density and double pass . . . normal, compressed and double width . . . friction AND tractor . . . multi-strike carbon ribbon cartridge . . . low-cost removable print head . . . quality construction

PRICE:
Parallel: **$CALL**
Cables available to suit most computers $35
MICROBEE CABLES **$50**

DISKETTES

CONTROL DATA DISKS IN PLASTIC BOX for APPLE, IBM, COMMODORE, ATARI, OSBORNE etc

$35 per box
$310 per 10 Boxes
($32/280 tax exempt)

+**$2** POST

AUTOMATIC ICE MODEM

Just released. Dennis O'Keefe's auto-answer, auto-dial 300/1200 baud RS-232 modem. Ring for details.

$6 COUR.

$259 ex **$295** inc

ROBOT ARM for Apple

$10 COUR.

Includes APPLE INTERFACE and SOFTWARE
This is **NOT** a Toy!

A teaching tool or real-world device. Manufactured by Taiwan's largest Industrial Robot Manufacturer.

$1995 ex **$2345** inc

AMUST 10Mb HARD DISK for APPLE

The one you've been waiting for.

$10 COUR.

Includes interface and all software

$CALL

DETACHABLE KEYBOARD for APPLE II+

$6 COUR.

Just arrived. IBM Style.
Function, Cursor, Numeric
Lower Case Keys
Great Value at **$225** ex **$259** inc

APPLE ADD-ONS

	ex	inc
S.A.M. Synthetic Speechcard Phoneme-based	$ 65	$ 75
VISION 80 80 Column Card for Apple II/IIe (Please specify) Great Value at	$179	$199
VISION 80 128K Cards	$345	$395
16K CARD	$ 80	$ 90
ATLAS SLIMLINE DRIVE	$325	$365
APPLE JOYSTICK	$ 45	$ 45
APPLE KEYBOARD FUNCTION EXTENDER	$ 99	$ 99

ORDERING INFORMATION

Most of our 5800 customers around Australia order by Bankcard over the phone. Delivery is by WARDS COURIER at $6 or $10 for Overnight Delivery anywhere in Australia, or by Australia Post for cheaper goods. If you own an Apple, IBM, TRS-80, Atari, Osborne, Commodore 64, MicroBee, Kaypro or Amust microcomputer then we have peripherals and software for you at some of the lowest prices in Australia. Ring or write for our FREE catalog and newsletters. Six Month Full Warranty on Hardware.

GOODS DELIVERED BY WARDS EXPRESS

USER GROUPS INDEX

ducers or distributors who would be interested in serving their market. All correspondence should be sent to Beebnet, P.O. Box 262, Kingswood 5062.

S.A.A.U.C.
Contact The Secretary S.A.A.U.C., C/- The Bookshelf, 169 Pirie Street, Adelaide 5000.

COMMODORE COMPUTER USERS ASSOCIATION OF S.A.
This group meets at 7.30pm on the first Tuesday of each month at the Adelaide University Union Building. Further information is available from Earle Rowan, Commodore Computer Users' Association of S.A., P.O. Box 60, Clarence Gardens 5039.

COMMODORE VIC COMPUTER USERS ASSOCIATION
The club meets monthly and can be contacted at 13 Miranda Road, Paralowie 5108 Attention: Eddie Hann, Secretary.

SORCERER USER GROUP OF SA (SUGSA)
Contact Brian Richards, Secretary, SUGSA, P.O. Box 647, Salisbury 5108. Meetings are held on the second Wednesday of every month on the first floor of the Commodities Exchange Building, 123 Pirie Street, Adelaide.

S.A.M.G.
The South Australian Microprocessor Group meets at the Thebarton High School in Ashley Street. Contact can be made through P.O. Box 113, Plymouth, S.A. 5038 or by phoning (08) 278 7288.

TI-99/4 USER GROUP
Contact Ray Mountford, 7 Baker Street, Enfield, S.A. 5085. Telephone: (08) 260 6587.

MicroBee Users Group of South Australia membership is $15.00 per annum which includes 11 newsletters. For further information on membership, meetings, newsletters, etc contact Brian Uren on (08) 260 5038 (6-8pm) or by mail to G.P.O. Box 767, Adelaide, S.A. 5001.

The IBM PC SA Users Group (to which all 8088 users are welcome) can be contacted on (08) 261 9590, Don Richards, or write to P.O. Box 68, Walkerville 5081.

The Adelaide Kaypro User Group has just started. Any interested parties should write to 100 Pirie Street, Adelaide, Attention: The Adelaide Kaypro User Group.

Interested persons may obtain information about the Adelaide Atari Computer Club from the Secretary, P.O. Box 333, Norwood 5067. At present the Club has 40 members, meets monthly and produces a Club magazine.

An Hitachi user group has been formed. Interested parties should contact Cliff Hignett at 45a Ormond Avenue, Daw Park 5041 or 'phone BH (08) 274 9341, AH (08) 295 2778.

TASMANIA

DEVONPORT COMPUTER INTEREST GROUP
For information contact John Stevenson, RSD 422, Sheffield 7306 or telephone (004) 92 3237.

TASMANIA APPLE USERS CLUB
Meetings are held on the 3rd Tuesday of each month at various locations. New members are most welcome and enquiries may be made to Ray Williams, President/Secretary, P.O. Box 188, North Hobart 7002. Tel: (002) 34 1271.

TEMOS
All enquiries are welcome and may be directed to John Stephenson, President, 4 Melinga Place, Taroona 7000. Telephone: 27 8770.

The Spectravideo Computer Users Group of Tasmania has a membership fee of $15 which entitles members to a monthly newsletter that is beginning shortly and to discounts in computer equipment as they become available to the club.

A monthly meeting of the club will begin also and members will be notified by mail.

The club is open to all owners of Spectravideo Computers and to all persons who are planning to purchase a Spectravideo Computer.

Send mail to Mr P W Deckert, 48 Heather Street, Launceston 7250 or 'phone 444836.

The Tasmanian Commodore Users Association is primarily for Commodore users, it has an Associate membership status catering for users of other computers. It is a non-profit organisation. Contacts are The Secretary, G.P.O. Box 391D, Hobart 7000 or telephone Vincent Staggard on (002) 720 295.

TI-99/4 USER GROUP
Contact Andrew Zagni, 161 Carella Street, Howrah, Tas 7018. telephone: (002) 47 8738.

WESTERN AUSTRALIA

OSWEST
The Osborne Users Group of Western Australia. Get details from Richard Eddy, 28 Lawlor Road, Attadale 6156. Telephone: 330 3439.

The MicroBee Users' Group of WA meets on the first Sunday of each month at the Sir Charles Gairdner Hospital (Nurses' Lecture Theatre) between 7 and 9pm. A newsletter and library are provided. Telephone Mike Oborn on (09) 447 5366 for more details.

NORTHERN TERRITORY

DBUG
The Darwin MicroBee Users Group can be contacted by telephoning Felion Molina on 82 5613 (BH) or 88 1455 (AH). The club's address is Box 3111, GPO Darwin 5794.

NEW ZEALAND

COMBINED MICRO-COMPUTER USERS GROUP (CMUG)
This is an association of microcomputer clubs, groups, etc, formed to co-ordinate activities and to give a combined voice on topics concerning all micro users. Representation from all clubs and groups is welcomed to CMUG, C/- P.O. Box 6210, Auckland.

AUCKLAND COMPUTER EDUCATION SOCIETY (ACES)
Ray Clarke, 1 Dundas Place, Henderson, Auckland, (09) 836 9734 (H).

HP41C USERS GROUP (AUCKLAND)
C/- Calculator Centre, P.O. Box 6044, Auckland, Grant Buchanan, (09) 790 328 (W). Meets 3rd Wednesday, 7pm at Centre Computers, 1 Great South Road, Epsom.

NZ TRS-80 MICRO-COMPUTER CLUB
Olaf Skarsholt, 203a Godley Road, Titirangi, (09) 817 8689 (H). Meets 1st Tuesday, VHF Clubrooms, Hazel Avenue, Mt Roskill, Auckland.

OSI USERS GROUP (AK)
Vince Martin-Smith, 44 Murdoch Road, Grey Lynn, Auckland. Meets 3rd Tuesday, VHF Clubrooms, Hazel Avenue, Mt Roskill.

SYMPOOL (NZ SYM USER GROUP)
Mark Bennett, P.O. Box 651, Manurewa, (09) 266 6994 (H).

ATARI 400/800 USER CLUB
Dave Brown, P.O. Box 6053, Hamilton, (071) 54 692 (H).

GISBORNE MICRO-COMPUTER GROUP
Ron Taylor, 17 Byron Street, Gisborne, (079) 81 450 (H).

MOTOROLA USER GROUP
Harry Wiggans, (ZL2BFR), P.O. Box 1718, Palmerston North, (063) 82 527 (H).

TARANAKI MICRO-COMPUTER SOCIETY
P.O. Box 7003, Bell Block, New Plymouth, Francis Slater (067) 84 514.

OSBORNE USER GROUP
Dr Jim Baltaxe, 18 Matipo Street, Palmerston North (063) 64 411.

HAWKES BAY MICRO-COMPUTER USERS GROUP
Bob Brady, Piramai Pharmacy, Piramia Plaza, Napier, (070) 439 016.

CHRISTCHURCH MICRO-PROCESSOR USERS GROUP
J D Mann, 330 Centaurus Road, Cashmere, Christchurch (03) 325 652.

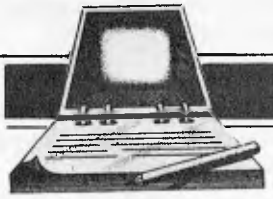
CHRISTCHURCH '80 USERS GROUP
David V Smith, P.O. Box 4118, Christchurch (03) 63 111 (H).

USER GROUPS INDEX

CHRISTCHURCH PEGASUS USERS GROUP
Don Smith, 53 Farquhars Road, Redwood, Christchurch (03) 526 994 (H), 64 544 (W) ZL3AFP.

NELSON VIC USERS GROUP
The group writes: We wish to contact other VIC or Commodore Users Groups to exchange VIC public domain software, newsletters, etc. Contact us (airmail please) at: P.O. Box 860, Nelson, New Zealand. Phone: (054) 79 361.

END



DIARY DATA

Readers are strongly advised to check details with exhibition organisers before making travel arrangements to avoid wasted journeys due to cancellations, printer's errors, etc.

Hong Kong	Percom '83 Contact: Adsdale Exhibition Services, 194 Lockhard Road 20/F, Wanchai, Hong Kong	December 16-19, 1983
Sydney	The Australian Personal Computer Show Contact: Australian Exhibition Services (03) 20 1208	March 14-17, 1983
Sydney	Data '84 Contact: Graphic Directions (02) 212 4199	May 22-24, 1984
Perth	Microcomputer Exhibition Contact: Jenna Ledgerwood (09) 325 0111	May 22-25, 1984

NETWORK NEWS

Steve Withers and Peter Tootill summarise what's new in the telephone networking world. As more networks appear — and as more facilities are added to existing ones — we'll report them in this section, which appears monthly.

The interest in the Bulletin Board scene continues to grow, but one difficulty that arises when discussing this hobby is what to call it? 'Communications', 'Networks' and the like are all associated with mainframes or tying numbers of micros to a central disk system. 'Telephoning networking' is probably the best suggestion I have heard so far. Has anyone any suggestions?

Network jargon

The jargon associated with this field is, in many cases, a bit difficult for those not familiar with it. Over the next few months I will be explaining some of the more common terms that you may come across. Let's start off with Bits and Bauds. What is the difference between 'baud rate' and 'bit/sec'? If you look 'baud rate' up in a data communications dictionary, it will say something about 'modulation rates' or perhaps 'signalling elements'. The key point to get hold of is that the baud rate refers to how often the signal changes, and takes no account of how much data the signal contains, whereas 'bits/sec' is a measure of how much data is being sent. If each part of the signal contains more than one 'bit' of data, the number of bits per second being transmitted will be greater than the baud rate. The data rate in bits/sec will always be a simple multiple of the baud rate.

Let's take an example. The CCITT V22 standard allows 1200 bits/sec to be sent at 600 baud. This is because the data is divided up into pairs of bits, and each part of the signal represents one of these pairs. There are only four possible combinations of the binary digits, (i.e. 00, 01, 10, 11) so only four different types of signal are needed to represent all of them. Thus if the rate of change of the signal (called the modulation rate) is 600 times a second (600 baud), you will be sending twice 600, or 1200 bit/sec. The new V22 bit standard divides the signal into groups of four bits, and can transmit 2400 bits/sec at 600 baud! The groups of two and four bits are called 'dibits' and 'quadbits' respectively. I hope that makes everything clear!

Subscriber commercial systems in Australia:

The Australian Beginning. Subscribers only. Sydney and Melbourne access numbers. A variety of services including electronic mail, software upload/download, information services and telex. Cost $100 joining fee (much cheaper at some dealers), $10 per hour (8am—6pm) or $4.50 per hour (6pm—8am, all day weekends). Information: The Australian Beginning, 24 Camberwell Road, Hawthorn East, Vic 3123. Tel: (03) 813 1133.

NETWORK NEWS

Australian networks

Micro Design Lab RCPM Tel: (02) 663 0151. System Operator: Stephen Jolly. Hours: 5pm—7am weekdays, 24 hours weekends.

Mi Computer Club BBS Tel: (02) 662 1686. Program down-loading. Hours: 24 hours daily.

Sydney Public Access RCPM Tel: (02) 808 3536. System Operators: Barrie Hull and David Simpson. Hours: 24 hours daily.

Software Tools RCPM Currently "off-line" — I'm told the system operator (Bill Bolton) is moving house.

MICOM CBBS Tel: (03) 762 5088. System Operator: Peter Jetson. Hours: 24 hours daily.

Gippsland RCPM Tel: (051) 34 1563, System Operator: Bob Sherlock. Hours: 24 hours daily.

Sorcerer Computer Users Association CBBS Tel: (03) 836 4616. System Operator: Bruce Alexander. Program down-loading for SCUA members. Hours: 24 hours daily.

TARDIS RCPM Tel: (03) 67 7760. Hours: 6pm—8am weekdays, 24 hours weekends.

American/Canadian networks

TYPE	SYSTEM NAME	NUMBER	NOTES
Forum 80	HQ system	0101.816-8617040	
CBBS	HQ system	0101.312-5458086	
FBBS	HQ system	0101.312-6778514	
ABBS	Ottowa, Ontario	0101.613-7252243	
ABBS	HQ system	0101.703-2552192	
MABBS	Fort Walton Beach	0101.904-8621072	
Bull-80	Alabama	0101.205-4920373	
Conn-80	Colour Computer	0101.212-4413755	colour graphics for TRS-80 Colour

European networks

ELFA	ABC-MONITOR Sweden	010.4687300706	Half duplex
ABC-Banken	Halmstadt, Sweden	010.4635110771	
ABC-MONITOR	ABC Club of Sweden	010.468801523	Passwords required
CBBS	Gothenburg, Sweden*	010.4631292160	75/1200 baud
		010.4631690754	300 baud

*After receiving the tone and connecting your modem, either type: <C/R> or type: <COM C/R>. The system then asks for a password which is: 'cbbs' *in small letters*!! If you only get '>' when you dial up, the system needs resetting and you type <I> C/R.

UK networks

CBBS North East Tel: (0207) 543555. System Operators: Trevor Smith and Malcolm Piper. Hours: 2.30pm—9am daily. Tel: (0207) 32447. Hours: 7pm—midnight

CCITT standards; midnight—8.30am Bell 103 (US) standards.

Forum-80 Hull (Forum-80 HQ) Tel: (0482) 859169. System Operator: Fred Brown. International electronic mail, library for up/down loading software.

Forum-80 Users group, Pet Users section shopping list system. Hours: Tues/Thurs 7—10pm; Sat/Sun 1—10pm; nights, midnight—8am, US (Bell 103) standards.

Forum-80 London Tel: (01) 902 2546. System Operator: Victor Saleh. Electric mail, library for downloading. Hours: Evenings & weekends.

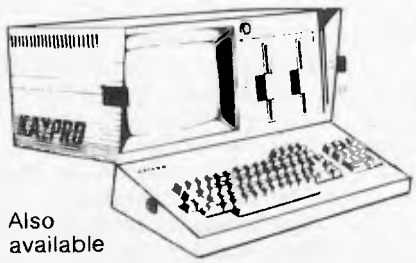
CBBS London Tel: (01) 399 2136. System Operator: Peter Goldman. Facilities: electronic mail, program downloading. Hours: Sun 5—10pm.

Mailbox-80 Liverpool Tel: (051) 4282733. System Operator: Peter Tootill. Electronic mail, downloading, TRS-80 information. Hours: 24 hours daily.

Bettisfield Remote CP/M Tel: (094875) 378. Systems Operator: Jim Eccleston. Hours: 1—4pm & 7—11pm daily.

The above information is correct and current, to the best of my knowledge, but I would be pleased to receive corrections and updates to: Steve Withers, *C/-Australian Personal Computer*, P.O. Box 298, Clayton, Vic 3168.

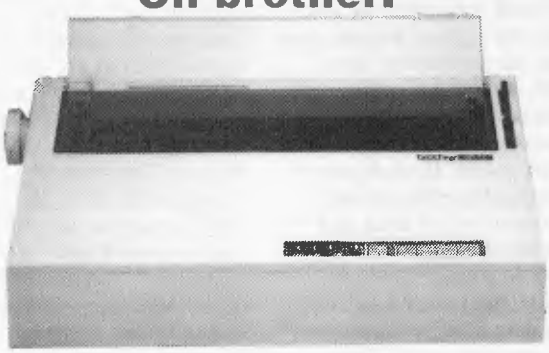
The exciting Brother HR-15 letter quality daisy-wheel printer has optional low profile plug-in keyboard, Tractor Feeder for Data Processing, and Auto Cut Sheet Feeder for Word Processing.



Also available

KAYPRO II **KAYPRO IV & 10** **COLUMBIA** 16 bit IBM PC compatible

Oh brother!



Also available is the Datatrend PX-80 DOT MATRIX PRINTER with its own internal micro-processor.
Amongst the wide selection of typewriters is the brother CE-60 electronic typewriter and the Praxis 41 electronic typewriter with interface from Olivetti.

CAULFIELD BUSINESS COMPUTERS
(A division of Caulfield Typewriters)
874 Glenhuntly Road, Caulfield South 3162
Telephone: (03) 528 4555

C-TECH pty.ltd.

COULD YOU REFUSE A COMPUTER WITH THESE FACILITIES

GRAPHICS
800 x 400 Pixels the highest resolution available of any micro on the market today. To do real graphics in a working environment, this is the only computer capable.

MEMORY
Standard with 128K RAM, upgradeable to 1 Mbyte. Includes a massive 80K for graphics.

ERGONOMIC DESIGN
Sculpted keyboard detached from main computer, swivel and tilt of screen. Green phosphor with anti grare filter.

KEYBOARD
Software programmable keyboard. Has function keys for quick operation of dedicated software. Full control of screen brilliance from keyboard.

PRICE
Sirius 1 with 1.2Mbyte drive capacity and 128K RAM is **$5250** plus tax.
Sirius 1 with 2.4Mbyte drive capacity and 256K RAM is **$6400** plus tax.
Sirius 1 with 10Mbyte hard disk and 256K RAM is **$9600** plus tax.

16 BIT PROCESSOR
Uses the well known Intel 8088 processor with the MSDOS and CP/M86 operating systems. Provides fast processing for number crunching or graphics.

DISK DRIVES
Comes standard with massive 600 per drive, 1.2Mbyte per drive or 10Mbyte hard disk optional. Just compare that storage with our nearest competitor.

SOFTWARE
See below for list of standard packages. There is a vast array of software available for the Sirius. With over 1000 entries in the software catalogue and growing constantly.

SUPPORT
Thousands of units installed in Australia and many more thousands around the world. Maintenance is available throughout Australia.

STILL NOT CONVINCED?

SOFTWARE

SPELLBINDER	$635.00
SELECT WORD PROCESSOR	$260.00
WORDSTAR	$500.00
WORDSTAR/MAILMERGE	$725.00
SUPERCALC	$150.00
MULTIPLAN	$310.00
MPLOT	$290.00
DBASE II	$700.00

Well what about if we throw in a brand new CP80 printer, worth $500. If you are still doubtful, come in, have a chat, sit down with a Sirius for a few hours and see what it can do. We won't hassle you, or give you the high pressure sell.

SILICON OFFICE	$1800.00
CBASIC 86	$400.00
BASIC86 COMPILER	$500.00
MS-FORTRAN	$510.00
MS-PASCAL	$610.00
MS-COBOL	$925.00
GRAPHICS TOOLKIT	$300.00
AUTOCAD/ AUTODIMENSION	$2800.00

C-TECH pty. ltd. 48 A'Beckett Street, Melbourne, Vic., 3000 . . . .ph. 347 7917
Computer Division of Ritronics Wholesale

DO

COMPARE THE MOST VERSATILE MICROCOMPUTER YOU CAN BUY WITH OTHERS

MAX-80

128K RAM Standard with option to use 64K as RAM Disk

Including CP/M Plus and LDOS with optional CP/M 86 and MS-DOS giving access to more software than any other micro

1 year limited warranty on hardware

Rugged construction includes heavy duty case and full-stroke sculptured keyboard

Optional Local Area Network

5MHz Z80B (run 25% faster than TRS-80 Model 4). Optional 5MHz 16 bit 8088 expansion

All Disk Interfaces built in. Plug in any combination of 5¼", 8" Floppies and Winchester Hard Disk

Built in Hard Clock/Calendar with permanent battery backup

Standard Centronics-type Parallel Printer Port

Two RS-232C Serial Ports for Modems, Printers or what-have-you

Built-in numeric key pad with 4 programmable function keys

All characters are software definable: Greek, French. Spanish etc.

Compact & portable

SOFTWARE SELECTABLE SCREEN FORMAT
24 x 80, 16 x 32, 16 x 64
Using Standard Hi-Res Screen

A FLEXIBLE SYSTEM AT A FLEXIBLE PRICE

$1790.00 (INC TAX)

EXTRA SOFTWARE

KIS
Kitchen Integrated System (Pantry Inventory Control. Grocery Shopping List, Ingredient Inquiry, and many more). **$60.00**

PERFECT SOFTWARE (Perfect Writer, Perfect Speller, Perfect Calc, and Perfect Filer)..... **$769.00**

Executive Diary System **$75.00**
(The above prices available to MAX-80 Owners only)

ACCESSORIES

MicroMERLIN 16 bits 5MHz 8088, 128K RAM (exp to 768K), CP/M 86 or MS-DOS, IBM-PC AND TI Diskette Format Available for TRS-80 MODEL I or III or 4, LNW and MAX-80..... **$1350.00**

Build Your Own PRINTER BUFFER — BARE BOARD..... **$60.00**

TO ORDER CALL MARIAN ON (03) 560 7664 OR WRITE TO:

THE HOUSE OF MICRO & SOFTWARE

P.O. BOX 475, MOUNT WAVERLEY, 3149 (DEALER ENQUIRIES WELCOME)

MicroMERLIN is a Registered trademark of MICRO PROJECTS ENGINEERING INC. TRS-80 is a Registered trademark of TANDY Corporation. IBM-PC is a Registered trademark of IBM. LNW is a Registered trademark of LNW Research. MS-DOS is a Registered trademark of MICROSOFT INC. MAX-80 is a registered trademark of LOBO SYSTEMS INC. CP/M & CP/M 86 are Registered trademarks of Digital Research INC. Perfect Writer, Perfect Filer, Perfect Speller, Perfect Calc are Registered trdemarks of Perfect Software INC.

PROGRAMS

APC is interested in programs written in any of the major programming languages for all home and small business micros. When submitting programs to APC please include the following:
(a) A cassette or disk of the program.
(b) A listing on plain, white paper (typewritten if no printer available).
(c) Comprehensive but brief documentation.
(d) A suitable SAE if you would like your materials to be returned after use.
Please mark (a), (b) and (c) with your name, address, program title, machine (state minimum RAM where appropriate) and — if possible — a daytime number. All programs must, please, be fully debugged. Programs are paid for at the rate of $20 per page of published listing, plus a $50 bonus for the Program of the Month. Send contributions to: APC Programs, P.O. Box 298, Clayton, Vic 3168.
We'll do our best to acknowledge receipt of programs as quickly as possible, but following this acknowledgement it will usually be some time before a decision can be made, so please be patient! Generally speaking, programs which are rejected for any reason are returned fairly quickly, so 'no news . . .'

This month's programs include a routine to change the screen format of the MicroBee, an educational test on the Apple as well as listings for the VIC-20, TRS-80, MicroBee and VZ-200.

We've had very few VZ-200 programs and even less for other recent entries into the home micro marketplace. If you would like to see listings for *your* machine, start the ball rolling by sending in your own work — and please remember the suggested guidelines for contributions.

Games
Scientific/mathematic
Business
Toolkit/utilities
Educational/Computer Aided Learning

Program of the Month

VIC-20 Robotank

by Bryn Phillips

Just to show a listing doesn't need to be ten metres long to gain the Program of the Month award, Robotank is simple, well-presented and a lovely idea. The program is a Logo-based game for the unexpanded VIC-20.

On running the program, there will be a short delay while the characters are defined. To set the screen, press any key. A battle ground is drawn, containing a number of targets: houses, enemy tanks and guns. The Robotank is situated at the bottom left-hand corner of the screen.

The idea of the game is to program the tank with a series of Logo-style commands in order to destroy as many targets as possible. The available commands are:—
F)orward one length
L)eft 90 degrees
R)ight 90 degrees
S)hoot
P)rogram complete — go

A further command, D)elete last instruction, is offered in case of mistakes. The following simple program, FFFRSLFFSP, would cause the Robotank to move forward three lengths, turn right 90 degress, shoot, turn left 90 degrees, move two lengths forward then shoot again.

The maximum Robotank program

MODEL III

★ DISK CONTROLLER●
A premium controller for the Model 3 Tandy Computer.Double density with precision LSI Data Separator for reliable performance. Mix 5 and 8 inch drives. Battery powered. Clock/Calendar and gold plated edge connectors included. Sold by itself or in complete kit with Switching Power Supply. Drive brackets, cables and hardware and fitting instructions.
PRICE — $530. Disk Drives at competitive prices.
Also fits Model 4.
●

★ VIDEO — CP/M EXPANSION
Your Model 3 can have 80 column by 24 lines video display, and ability to run a 64K CP/M Operating System, and even an extra 64K bank of memory, YET STILL OPERATE IN ITS ORIGINAL FORM WHEN REQUIRED. The VID-80 fits inside the computer and is simply installed following our instructions.
PRICE — $365, CP/M $199, extra 64K $116

★ SPRINTER
Plug-in circuit with Z80B CPU to reliably "hot-up" the Model 1 or 3 by increasing the clock speed (but slowing down when required). Model 1 version optionally with Parallel Printer Port.
PRICE — $135. Model 1 with Printewr Port $167

STOP PRESS

★ MODEL 1 DISK CONTROLLER
Includes printer interface and plugs straight into keyboard! With Slim-line 40 track drive, LSI Data Separator, gold plated connectors, only $580. Low cost Double Sided and/or Double density options.

★ MODEL 1 DOUBLERS
If you have drives, increase reliability and double storage with our Double Density Adaptors $179.

MODEL 4 MEMORY KITS
16K — 64K with instructions $119
64K — 128K with instructions $160

ALL PRICES INCLUDE SALES TAX BUT ARE SUBJECT TO CHANGE. SEND YOUR NAME AND ADDRESS FOR COMPLETE PRICE LIST AND OUR NEW NEWSLETTER . . . FREE!
NOTE NEW PHONE NUMBER AND ADDRESS

ASP MICROCOMPUTERS
P.O. BOX 259,
CAULFIELD EAST, VIC 3145
Telephone: (03) 500 0628

XMAS SALE

Special Offers

The BEST
HOME Computers,
Educational Business Solutions

COMMODORE 64 — 64K
VIC-20
Apple II —, IIe, III — 256K
Sinclair Spectrum — 16K & 8K
Texas Instruments
Sharp 64K

PLUS a wide range of programmes: local, imported, third party

PRINTERS, DISK DRIVES, BOOKS, MANUALS, DISKS, TAPES, PAPER STORAGE DESKS, LIGHT PENS, TOUCH TABLET

PACKAGE DEALS
Bank Card, Amex, DC

COMPUTER FOCUS
224 George Street, Liverpool 2170
Telephone: (02) 600 8222

VZ 200 SOFTWARE

An increasing range of quality software.
Rapid turnaround of orders and enquiries.
Realistic prices and helpful user support.

SUPER INVADERS: 10 levels, fast action and great sound effects..... **$10.00**
PAKMAN: 4 different mazes, bonus symbols and great sound effects..... **$10.00**
GRAPHICS PACKAGE: Character designer, drawing commands and demonstration..... **$10.00**
VZ DEBUG: Disassembler and monitor combined, over 20 commands **$20.00**
BLANK DATA CASSETTES: Top quality reliable loading everytime..... C12 **$1.85**
..... C24 **$2.25**
HANDLING CHARGES: Per order..... **$1.50**

Send S.A.E. for further information or your order to:

R.S. MILLER
8 Mulga Street, Altona 3018
PHONE ENQUIRIES:
J. Hawley (03) 367 1469

PROGRAMS

length is 40 commands: if you do not enter P after 40 commands, the tank will start automatically.

If the tank crashes into any obstacle, the game will end; otherwise, you have three runs in which to destroy all targets. The points value of the targets increases with each mission, so careful planning is required to achieve high scores.

Our only complaint about the game is that the aim is to destroy things rather than do something constructive The tank could become a bulldozer with a number of building blocks scattered about the screen. The idea would then be to push the blocks into some predetermined shape.

This said, it's a well-conceived program and one which will appeal to all Logo fans. Meantime, if anyone feels like writing that bulldozer game, let us know.

```
10 PRINT"■■■■■■■■■ROBOT TANK■■■■■■■■■■■■PLEASE WAIT"
50 POKE52,28:POKE56,28:CLR
60 FORI=7168TO7679:POKEI,PEEK(I+25600):NEXTI
70 FORC=7384TO7415:READA:POKEC,A:NEXT
80 FORC=7432TO7471:READA:POKEC,A:NEXT
90 POKE36869,255
94 DATA0,0,120,252,255,252,120,0,16,16,56,124,124,124,124,56
95 DATA0,0,30,63,255,63,30,0,56,124,124,124,124,56,16,16
96 DATA0,2,4,72,48,240,232,224,0,0,0,31,24,60,255,255
97 DATA0,0,0,16,60,126,127,255,0,16,57,125,255,147,147,243
98 DATA0,72,130,24,57,4,64,8
100 P1=8164:P2=38884
102 DIMP$(42)
105 PRINT"■■■■■PRESS ANY KEY"
107 GETA$:IFA$=""THEN107
108 PRINT"■"
110 FORI=1TO3
111 C=27:X=0:Y=0:SC=0:TM=0:MS=1
115 X=INT(RND(1)*18)+1:Y=INT(RND(1)*18)+1
120 IFPEEK(P1+X-22*Y)<>32THEN115
125 POKEP1+X-22*Y,33:POKEP2+X-22*Y,2
130 NEXTI
135 FORI=1TO5
140 X=INT(RND(1)*18)+1:Y=INT(RND(1)*18)+1
145 IFPEEK(P1+X-22*Y)<>32THEN140
150 POKEP1+X-22*Y,34:POKEP2+X-22*Y,0
155 NEXTI
160 FORI=1TO20
165 X=INT(RND(1)*17)+2:Y=INT(RND(1)*17)+2
170 IFPEEK(P1+X-22*Y)<>32THEN165
175 POKEP1+X-22*Y,35:POKEP2+X-22*Y,5
180 NEXTI
182 FORI=1TO10
184 X=INT(RND(1)*18)+1:Y=INT(RND(1)*18)+1
186 IFPEEK(P1+X-22*Y)<>32THEN184
188 POKEP1+X-22*Y,36:POKEP2+X-22*Y,0
190 NEXTI
195 X=1:Y=1
196 POKEP1+X-22*Y,C:POKEP2+X-22*Y,6
198 X1=X:Y1=Y
200 FORI=1TO41
210 GETA$:IFA$= "F"ORA$= "S"ORA$= "L"ORA$= "R"ORA$= "D"ORA$ ="P"THEN220
215 GOTO210
220 IFA$="P"THEN290
225 POKE36878,10
226 FORM=1TO5:POKE36876,150+VAL(A$):NEXTM
227 POKE36878,0:POKE36876,0
230 IFA$="D"THENI=I-1:PRINT"■"TAB(I-1)" ":GOTO210
240 P$(I)=A$
250 PRINT"■■"TAB(I-1)P$(I)
260 NEXTI
290 TM=0
300 FORJ=1TOI-1
301 Z=0
305 IFP$(J)="S"THEN510
310 IFP$(J)="L"THENC=C+1:IFC=31THENC=27
320 IFP$(J)="R"THENC=C-1:IFC=26THENC=30
330 IFP$(J)="F"ANDC=27THENX=X+1:IFX>20THENX=20
340 IFP$(J)="F"ANDC=28THENY=Y+1:IFY>18THENY=18
350 IFP$(J)="F"ANDC=29THENX=X-1:IFX<1THENX=1
360 IFP$(J)="F"ANDC=30THENY=Y-1:IFY<1THENY=1
370 POKEP1+X1-22*Y1,32
375 IFPEEK(P1+X-22*Y)<>32THEN2000
380 POKEP1+X-22*Y,C:POKEP2+X-22*Y,6
400 X1=X:Y1=Y
500 GOTO700
510 IFC<>27THEN550
520 FORX2=X+1TOX+5
525 IFX2>20THEN700
530 Y2=Y:GOSUB800
535 IFZ=1THEN700
540 NEXTX2
545 GOTO700
550 IFC<>28THEN600
560 IFC<>28THEN600
570 FORY2=Y+1TOY+5
575 IFY2>18THEN700
580 X2=X:GOSUB800
585 IFZ=1THEN700
590 NEXTY2
```

```
595 GOTO700
600 IFC<>29THEN650
610 FORX2=X-1TOX-5STEP-1
615 IFX2<1THEN700
620 Y2=Y:GOSUB800
625 IF Z=1 THEN700
630 NEXTX2
640 GOTO700
650 FORY2=Y-1TOY-5STEP-1
655 IFY2<0THEN700
660 X2=X:GOSUB800
665 IFZ=1THEN700
670 NEXTY2
700 PRINT"■■■■■■■■■■■■■■■■■■SCORE"SC
701 PRINT"■■■■HIGH"HG
703 PRINT"■■■MISSION"MS
705 NEXTJ
706 MS=MS+1
707 IFMS>3THENPRINT"■■■■■■GAME OVER":GOTO2020
710 PRINT"■                    "
715 PRINT"■■                   "
720 GOTO200
800 PK=PEEK(P1+X2-22*Y2)
802 IFPK=35THENZ=1:GOTO860
805 POKE36878,15
810 POKEP1+X2-22*Y2,46
820 POKEP2+X2-22*Y2,0
830 FORL=1TO10:POKE36874,220:NEXTL
840 POKEP1+X2-22*Y2,32
850 POKE36878,0:POKE36874,0
855 IFPK<>32THENGOSUB1500
860 RETURN
1500 POKE36877,220
1501 TM=TM+1
1505 POKEP1+X2-22*Y2,37
1506 POKEP2+X2-22*Y2,2
1510 FORL=15TO0STEP-1
1520 POKE36878,L
1530 FORM=1TO100
1540 NEXTM:NEXTL
1550 POKE36877,0:POKE36878,0
1551 IFPK=33THENSC=SC+25*TM
1552 IFPK=34THENSC=SC+15*TM
1553 IFPK=36THENSC=SC+5*TM
1555 Z=1
1559 POKEP1+X2-22*Y2,32
1560 RETURN
2000 X2=X:Y2=Y:GOSUB1500
2010 PRINT"■■■■■■TANK CRASHED"
2020 PRINT"■■PRESS Y TO PLAY AGAIN"
2030 GETA$:IFA$<>"Y"THEN2030
2040 IFSC>HGTHENHG=SC
2060 GOTO108
READY.
```

Missile Command

by Keith Whitwell

This is the first program we've received for the VZ-200 and it's from someone who's only in grade 8. It is a Basic version of the famous arcade game of the same name and uses the following keys for control of the "cross-hairs":

Y: UP
B: DOWN
G: LEFT
H: RIGHT

F: FIRE
U: ACCELERATE
N: STOP

Other instructions are included in the listing.

```
0 REM MISSILE COMMAND, KEITH WHITWELL, 8F, SPLC, 31/10/83
1 CLS:PRINT"          ■■■■■■■ ■■■■■■■":PRINT
2 PRINT "   BY KEITH WHITWELL, 8F, SPLC."':PRINTTAB(13)"1983"
3 PRINT:PRINT
4 PRINT:INPUT"INSTRUCTIONS";A$:IFLEFT$(A$,1)="Y"
  THEN GOSUB 3000
5 INPUT"LEVEL OF SKILL(1 (V.HARD)-4)";LS:IF LS>4 OR LS<1 THEN 5
6 FOR I=1 TO 4:C(I)=1:NEXT
9 GOSUB 2000
9 A=63:K=32:S=0
10 MODE(1):COLOR 4,1
11 MI=0
15 Y=50
16 O=0
```

Gambit Games
Dealer enquiries:
P.O. Box 124, Ivanhoe, Victoria 3079.
Phone: (03) 497 1283
PASCAL
for the Commodore 64

AUTHORISED DEALER

commodore COMPUTERS

An 8000 series (consisting of CBM 8032, 8050 (drive), 8023 printer and cables) accounting system with software from $5320.

PROGRAMMING COURSES for **COMMODORE COMPUTERS** starting at **$45.00** will begin early next year. Make enquiries now.

VIC 20

commodore 64

★ 27K MEMORY EXPANSION BOARD FOR VIC 20 NOW AVAILABLE

COMMODORE HARDWARE AND SOFTWARE SPECIALIST

MICRO VISIONS

Contact:
MICHAEL LA ROBINA, 472 ANZAC PDE., KINGSFORD, NSW 2032. (02) 662-4063.

PROGRAMS

```
 17 SC=SC+S:S=0
 18 CN=0
 20 FOR X=1TO127:SET(X,INT(Y)):Y=Y+.03:IF INT(Y)>0
    THEN GOSUB1000
 21 Q=INT(Y):NEXT
 30 SN=RND(5)+5
 31 COLOR 6:SET(SN,62):COLOR 7:SET(SC,62)
 90 X=A:Y=K
 100 A$=INKEY$
 101 IF A$="Y" THEN N=-1:M=0
 102 IF A$="B" THEN N=1:M=0
 103 IF A$="H" THEN M=1:N=0
 104 IF A$="G" THEN M=-1:N=0
 105 IF A$="F" THEN COLOR 3:GOSUB 1100
 106 IF A$="U" THEN GOSUB 1300
 107 IF A$="N" THEN N=0:M=0
 110 IF X+M>120OR Y+N>48 OR Y+N<5 OR X+M<5 THENN=0:M=0
 120 COLOR 1:GOSUB 1050:X=X+M:Y=Y+N:COLOR 3:GOSUB 1050
 130 COLOR 4:FOR I=1 TO 4:Y(I)=Y(I)+1:J=RND(2)-2:
     IF J=0 THEN J=1
 131 IF X(I)+J<5 OR X(I)+J>120 THEN J=-J
 132 X(I)=X(I)+J
 140 P=POINT (X(I),Y(I)):IF P=4 THEN COLOR 4:GOSUB 1200
 141 IF P=2 THEN COLOR 4:GOSUB 1500
 150 COLOR 3:SET(X(I),Y(I)):COLOR 4
 160 NEXT
 300 GOTO 100
1000 DATA1,18,1,1,13,2,15,17,2,1,13,3,16,16,3,1,7,4,9,
     12,4,4,7,5
1001 DATA 9,12,5,4,7,6,9,12,6,5,6,7,10,11,7,10,11,8
1010 CN=CN+1:IF C(CN)=0 THEN RETURN ELSE SC=SC+10
1011 COLOR 6:FOR I=1 TO 14:READ R,T,V
1020 FOR H=R TO T:SET(X+H,Y-V):NEXT:NEXT:RESTORE:COLOR 4:RETURN
1050 FOR H=-1 TO 1:SET(X+H,Y+1):SET(X+H,Y-1):NEXT
1051 SET(X,Y-1):SET(X,Y+1)
1052 RETURN
1100 REM
1101 FOR I=1 TO 4:IF X(I)<X+LS AND X(I)>X-LS THEN 1103
1102 NEXT
1103 IF Y(I)<Y+LS AND Y(I)>Y-LS THEN S=S+1:SET(S,62):GOTO 1110
1104 RETURN
1110 IF S=SN THEN A=X:K=Y:GOTO 2200
1200 FOR E=1 TO 5:SET (X(I)-E,Y(I)):SET(X(I)+E,Y(I))
1201 SET(X(I),Y(I)-E):SET(X(I),Y(I)+E):NEXT
1210 X(I)=RND(110)+6:Y(I)=6
1300 IF M=-1 THEN M=-4
1320 IF M=1 THEN M=4
1350 IF N=-1 THEN N=-4
1360 IF N=1 THEN N=4
1390 RETURN
1500 IF X(I)<20 THEN C(1)=0
1501 IF X(I)>33 AND X(I)<53 THEN C(2)=0
1502 IF X(I)>66 AND X(I)<86 THEN C(3)=0
1503 IF X(I)>100 THEN C(4)=0
1510 FOR C=1 TO 4:IF C(C)=0 THENF=F+1
1511 NEXT
1520 IF F=4 THEN GOSUB 1200:GOTO 2100
1530 F=0:GOTO 1200
2000 FOR I=1 TO 4:X(I)=RND(110)+5:Y(I)=RND(5)+6:NEXT
2001 RETURN
2100 FOR F=1TO30:X(I)=RND(100)+10:Y(I)=RND(40)+9:GOSUB
     1200:NEXT
2110 SC=SC+S
2111 FOR I=1 TO 1000:NEXT:CLS:PRINT@64,"SCORE="SC
2112 IF SC>HS THEN PRINT"YOU HAVE THE HIGH SCORE"HS=S
2113 PRINT:PRINT"DO YOU WISH TO PLAY THE NEW GAME"
2120 IF INKEY$="S" THEN 1
2121 GOTO 2120
2200 FOR Q=1 TO SL-1
2210 FOR I=1 TO 4:IF C(I)=0 THEN C(I)=1:I=9
2220 NEXT:GOTO 10
3000 CLS:PRINT"       MISSILE COMMAND"
3010 PRINT:PRINT"YOU COMMAND OUR ANTI-MISSILE
     MISSILES.YOUR";
3015 PRINT" JOB IS TO KEEP THEMISSILES FROM LANDING ON THE "
3020 PRINT"CITIES BY MOVING YOUR SIGHTS    ONTO THE HEAD OF ";
3025 PRINT"ONE OF THE FOURMISSILES COMING DOWN AND PRESS  ";
3030 PRINT "'F', WHICH FIRES YOUR MISSILE.
     IF IT HITS, THEN ";
3035 PRINT"THE MISSILE    WILL EXPLODE."
```

```
3040 PRINT:INPUT"HIT RETURN";A$
3045 CLS:PRINT"       [illegible]":PRINT
3050 PRINT"   Y  [illegible]"
3051 PRINT"   B  [illegible]"
3052 PRINT"   G  [illegible]"
3053 PRINT"   H  [illegible]"
3054 PRINT:PRINT"   F  [illegible]"
3055 PRINT"   U  [illegible]"
3056 PRINT"   N  [illegible]"
3060 PRINT:INPUT"HIT RETURN";A$
3065 CLS:PRINT"       [illegible]":PRINT
3070 PRINT"SCORING IS:"
3071 PRINT"           1 POINT PER MISSILE DISTROYED"
3072 PRINT"           10 POINTS PER CITY  NOT BLOWN UP"
3075 PRINT:PRINT"YOU WILL GET EXTRA CITIES EVERY"
3076 PRINT"SCREEN, THE NUMBER DEPENDS ON   THE LEVEL OF SKILL."
3080 PRINT:PRINT"THE GAME ENDS WHEN ALL OF YOUR  CITIES ARE";
3081 PRINT" DISTROYED"
3090 PRINT:INPUT"HIT RETURN";A$
3091 RETURN
```

New 'Bee Screen

by David Morrison

This is a novel idea and probably best explained by the author, so we'll reprint the letter accompanying his program listing:

With many enquiries as to whether the standard MicroBee 16k can be converted to 24 lines x 80 characters, without hardware modifications, led me to write a program. I wanted to add a command to Basic 5.10 that would convert the screen format. Unfortunately you cannot get 80 character long lines but you can add 10 extra lines giving a 26 x 64 format.

After hours of decoding the Basic eproms, the following program emerged that uses the NET command from Basic to convert the screens format, just like HIRES, LORES etc. Basic will then use the full 26 lines in listings runs etc, all as if there were 16 lines. A few things could not be changed like the CLS command which will only clear the top 16 lines so CHR$(12) needs to be PRINTed to clear the full screen. Also the CURS command cannot move the cursor to the bottom 10 lines so, if necessary, its position can be POKEd into location 10BH and 10CH, (the LSB and MSB of the cursor respectively).

The program can be broken into three main parts:

1. Video Driver — acts like the normal Basic 5.10 video driver that processes control codes, displays characters etc, except it can handle 16 or 26 lines in scrolling, clearing and so on.
2. Net Command — adjusts the 6545 registers for 26 lines, and creates smaller ASCII characters for the PCG from the Character ROMs.
3. Keyboard Driver — checks to see if the 26 lines have been "turned off" and if so resets the 6545 registers. The keyboard driver was modified because it was the only way to keep checking if HIRES, LORES, NORMAL etc had been executed (i.e. the keyboard is always scanned even if a program is running).

This program can run on 16k or 32k MicroBees with Basic 5.10. To run on other versions of Basic for the Microbee it may need modifications because it calls routines in the middle of the EPROMs from lines 710, 1060, 1410, 1650, 2640 and 2810 in the source listing.

Note that once the Basic program has been loaded and run it can be cleared by typing NEW. The 26 line option will still remain in the MicroBee even after a warm reset. To get rid of the NET function you need to cold start the Microbee by ESC and RESET.

```
00100 REM **** CHANGE SCREEN TO 26x16 FORMAT ****
00110 REM
00120 REM To change format use the NET command from BASIC.
00130 REM It may be used in the immediate mode or in a program,
00140 REM as long as no other commands follow it on the same
00150 REM program line. To return to 16x64 use the  NORMAL
00160 REM command.
00170 REM
00180 C=0:PRINT"Storing program into memory."
00190 FOR A=12288 TO 12777:READ B:C=C+B:POKE A,B:NEXT A
```

Gambit Games

G-Pascal:
The Complete Games System

Fully supports the Commodore 64's graphic and sound effects capabilities in a self-contained, easy to use programming package.
See your dealer today for a demonstration.
Available on disk or cassette for $79.50

Dealer enquiries:
P.O. Box 124, Ivanhoe, Victoria 3079.
Phone: (03) 497 1283

SOFTWARE AUTHORS AND DEALERS

At last a computer that lets you read/write/format virtually all soft sectored CP/M formats whether single or double density, single or double sided, 5" or 8" 48TPI or 96TPI

Includes:

- ★ Z80A CPU at 4MHz
- ★ Printer, modem and terminal serial ports
- ★ 1 5" double sided 48TPI disk drive
- ★ 2 5" double sided 96TPI disk drives
- ★ 1 8" double sided 48TPI disk drive
- ★ 64K memory
- ★ Freedom 100 Terminal
- ★ CP/M 80
- ★ Diskette format conversion utilities

Call for Pricing and Availability

Also available, inexpensive CPM to CPM file transfer program (including COM files)

Commercial and Professional Microsystems
9th Floor 505 St Kilda Rd
Melbourne 3004
Telephone: (03) 267 4755

cpm

MONEY BACK GUARANTEE: We will gladly refund your money if not satisfied. Simply return the kit in original condition and packaging to the above address within 14 days of purchase.

SPECTRUM SINCLAIR 48K RAM UPGRADE KIT

Now you can upgrade your 16K Spectrum to 48K.

Send $75 and within 14 days you will receive by certified mail component parts and instructions.

Should you wish us to perform the upgrade for you, send your machine and $95 to this address:

71 BROOKS STREET, STH OAKLEIGH, VIC 3067

Cheques/money orders payable to:

P. JACKSON
MAIL ORDER ONLY

SPECIAL THIS MONTH

APPLE COMPATIBLE SLIMLINE DISK DRIVES
$375 inc tax
FULL RANGE OF APPLE COMPATIBLE INTERFACES AVAILABLE — PHONE FOR A QUOTE

TAKE ADVANTAGE OF OUR SAME DAY SERVICE ON ALL BRANDS OF MICROS (SUBJECT TO PARTS AVAILABILITY)

LOGITRONICS

158 SYDNEY ROAD, BRUNSWICK
Telephone: (03) 380 1047

PROGRAMS

```
00200 READ B:IF B<>C THEN PRINT"Checksum error.':END
00210 POKE 172,25:POKE 173,49
00220 POKE 178,0:POKE 179,48
00230 POKE 195,49:POKE 194,177
00240 CLS:PRINT:NET
00250 PRINT"Screen is now in 26x64 format."
00260 END
01000 DATA 245,197,213,229,71,42,11,1,124,254,240,218,201,48
01010 DATA 254,248,210,201,48,58,24,49,254,128,40,6,124,254
01020 DATA 244,210,201,48,58,13,1,183,194,232,48,120,254,127
01030 DATA 202,186,48,254,32,48,48,254,8,202,178,48,254,10,202
01040 DATA 172,48,254,13,202,195,48,254,12,202,201,48,254,14
01050 DATA 40,31,254,15,40,86,254,7,202,219,48,254,27,32,3,50
01060 DATA 13,1,205,142,167,225,209,193,241,201,58,229,0,230
01070 DATA 128,168,119,35,58,24,49,254,128,124,40,22,254,244
01080 DATA 194,121,166,229,33,64,240,17,0,240,1,192,3,237,176
01090 DATA 33,192,243,24,24,254,246,56,206,125,254,128,56,201
01100 DATA 229,33,64,240,17,0,240,1,64,6,237,176,33,64,246,205
01110 DATA 134,167,225,17,192,255,25,62,239,188,32,173,17,64
01120 DATA 0,25,24,183,43,203,100,32,162,35,24,159,43,203,100
01130 DATA 40,248,54,32,24,150,62,192,165,111,24,144,33,0,240
01140 DATA 229,17,1,240,1,127,6,54,32,237,176,225,195,89,48
01150 DATA 229,33,100,0,6,68,205,95,167,225,195,89,48,175,50
01160 DATA 13,1,229,33,217,0,120,203,175,254,90,40,19,254,87
01170 DATA 40,18,33,212,0,254,65,40,11,254,83,40,4,225,195,39
01180 DATA 48,53,24,1,52,33,225,0,205,167,133,225,195,89,48
01190 DATA 0,217,8,58,24,49,254,128,40,103,33,0,240,17,1,240
01200 DATA 1,127,6,54,32,237,176,33,0,248,17,1,248,1,0,8,54
01210 DATA 0,237,176,62,1,211,11,33,0,248,17,3,240,14,3,6,3
01220 DATA 26,119,19,35,16,250,19,13,32,244,26,119,19,19,19
01230 DATA 19,1,7,0,9,124,181,32,228,175,211,11,62,127,50,69
01240 DATA 251,6,5,33,31,255,17,148,49,26,119,19,35,16,250,1
01250 DATA 153,49,17,165,49,205,209,49,62,128,50,229,0,50,24
01260 DATA 49,217,26,254,13,40,3,19,24,248,8,201,62,64,62,1
01270 DATA 62,95,64,75,55,30,3,26,28,72,9,105,9,95,64,76,55
01280 DATA 18,9,16,18,72,15,111,15,217,58,24,49,254,128,32,20
01290 DATA 58,229,0,254,128,40,13,175,50,24,49,17,153,49,1,165
01300 DATA 49,205,209,49,217,195,233,163,33,210,0,62,12,245
01310 DATA 126,18,10,119,35,19,3,241,61,32,244,33,225,0,205
01320 DATA 167,133,201,201
01330 DATA -14283
```

Grooble Grab

by Ben Brown

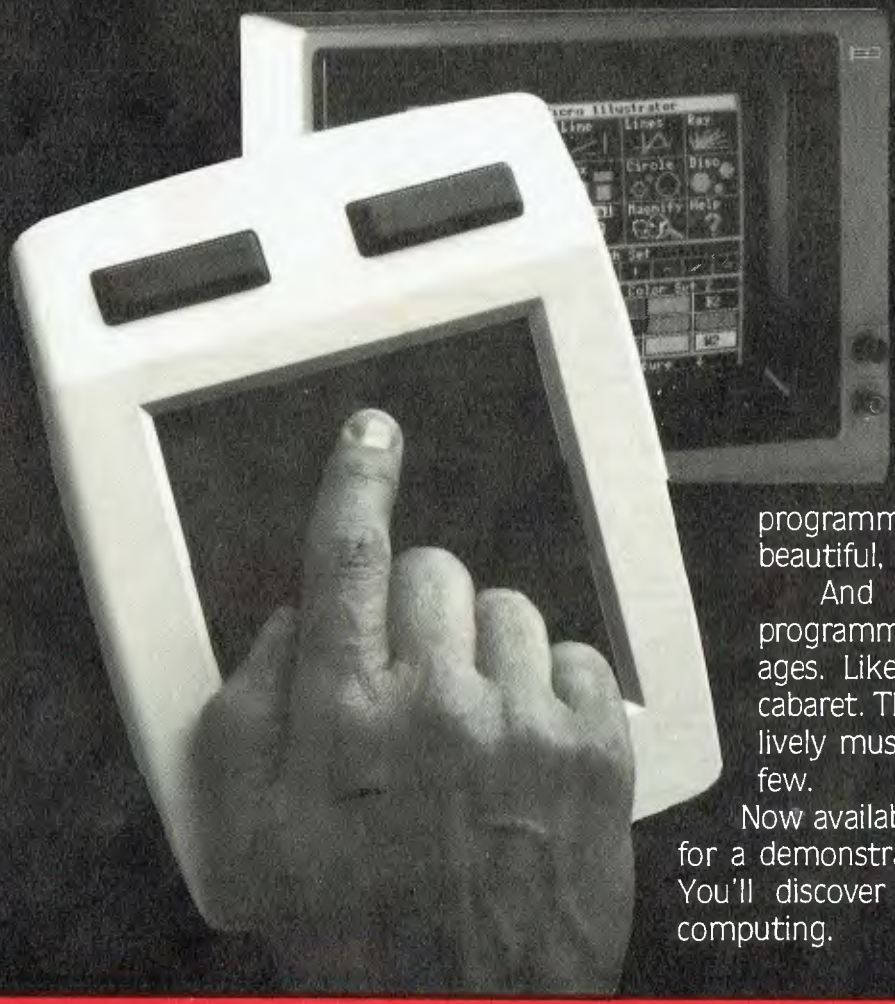
'Grooble Grab' is a skill and luck game where you move around the screen grabbing Grooblies (PCG alien) in as short a time as possible. It was written on a MicroBee 16k IC. There are seven Grooblies and ten thousand points when you begin. Your score is printed at the top of the screen and is constantly decrementing by fives. As you grab each Groobly the game gets harder (but don't give up on the last one.)

There are six main parts to the program:

1. Line 10/100 Instructions.
2. Line 250/330 Keyboard entry routine.
3. Line 340/410 PCG addressing.
4. Line 490/590 Your Player movement and printing.
5. Line 600/670 The Grooblies movement and printing.
6. Line 690/740 Ending.

```
00010 CLS
00020 FOR J=1 TO 10:INVERSE
00030 CURS 402:PRINT " G R O O B L E   G R A B "
00040 FOR K=1 TO 50:NEXT K
00050 NORMAL:CURS 402:PRINT" G R O O B L E   G R A B "
00060 FOR Y=1 TO 50:NEXT Y
00070 CURS 682:PRINT"BY BEN BROWN "
00080 NEXT J
00090 CLS
00100 CURS64:PRINT"'GROOBLE GRAB' BY BEN BROWN:  Is a real time, PCG graphics ga
me where you have to grab 7 groobles in as short a time as possible(you begin wi
th 10000 points)."
00110 PRINT"Your grabber's sights are the ";CHR$(188);CHR$(32);CHR$(190);" , and
 to move up, down, left and right, you use R,F,C, and V respectively."

00120 PRINT"Direct you sights on to a grooble and let the full effect of thegrab
ber go to work until you hear a tune, but quickly move on,  while your score is
constantly decrementing."
00140 PRINT:PRINT"Press any key to start"
00150 IF KEY$<>""THEN 160 ELSE 150
```

"Finally . . . a full-featured graphics tablet at a very affordable price."



Introducing the KoalaPad Touch Tablet, it's the friendliest innovation in personal computing.

With a touch of your finger, the KoalaPad tablet takes control of your computer. Faster than a paddle controller. More versatile than a joystick. And much friendlier than a keyboard.

The KoalaPad tablet is compatible with most game software. And with the KoalaWare Micro-illustrator software programme, it is the best way yet to create beautiful, high-resolution computer graphics.

And there are lots more KoalaWare programmes on the way for computer fans of all ages. Like the Dancing bear, a fun computer cabaret. There's a fast action spelling game and a lively music learning adventure just to name a few.

Now available from your computer dealer, so ask for a demonstration of the KoalaPad Touch Tablet. You'll discover a whole new dimension in home computing.

SPECIAL LIMITED OFFER
from
$149-95
INCLUDING SOFTWARE PACKAGE

Available for VIC 20, Commodore 64 and Atari, Apple, IBM, Commodore PCs. Dealer enquiries invited

DISTRIBUTED BY **OziSoft.**

50 Clarence Street, Sydney Telephone (02) 29 6330

IMAGOMAT 1078

SYSTEM 80 AND TRS-80 OWNERS

Z80 PROGRAMMING HAS EXTRA ROM FOR YOUR COMPUTER

Four preprogrammed Eproms are available with functions accessible by pressing Shift, Down arrow and appropriate key. Prices for each Utility are System 80 $42.00 Fitted $32.00 Kit. TRS-80 $59.00 Installed only.

22 FUNCTION COMBINATION UTILITY

Eprom includes Lower case driver, Key debounce, Display, Edit, Zero and Move memory with full screen display in ASCII or Hex, Forward and Reverse full screen or one line scrolling and on screen edit in ASCII or Hex with edit address displayed between graphic bars, System and Basic Program load with auto select between the two, addresses or basic program are shown during load, System tape copier, Save memory to tape, Go to Hex or Decimal address, Screen Editor, Screen Print video, Hex and decimal conversions, Set a memory size, Edit a typed line not on a line number, Line renumberer, Restore program after a NEW, Protect and Cancel Protect on basic program, used with renumberer to merge programs. AND MORE!

FAST LOAD AND SAVE TAPE UTILITY

Includes all the above functions, except Protect, Cancel Protect and Renumberer. Tape routines work at 3 times normal Baud. System Copier will load, save and verify at fast or normal Baud. Commands LOAD and SAVE are used for Basic. All Parameters available to CLOAD and CSAVE apply.

BASIC EPROM UTILITY

Includes Lower case driver, Key debounce, APC80 Commands, Protect, Cancel Protect and Restore Basic Program, Line Renumberer, Basic Program load, Screen editor, Screen print, Set memory size, Select cursor value, Line move and line check. Shift lock, Key repeat, Single keyword entry which can be toggled on or off.

MACHINE CODE EPROM UTILITY

Includes the functions of the first Utility less the basic Utilities, Display registers with half screen of memory or full screen of memory, Edit registers, Go to hex address with breakpoint, Relocate object code. Arrow keys move Edit bars to any location on the screen for easy edit.

MOD BOARDS FOR EXTRA EPROMS

Boards plug in for easy installation and have logic for full disk compatibility. Comes with switch and instructions to fit Port logic for internal switching using the OUT command. All the above Utilities can be deinitialised for easy swap or a plug in replacement ROM 1 is available to enable direct swap between Utilities using SHIFT CONTROL U and Auto initialise of Eprom and lower case. A 3 Eprom board is also available with keyboard decoding and bank select to run my new 4k Utility incorporating all the features of the above Utilities in 3k with a second 2k Eprom. Boards come ready assembled, 2 Eprom board $17.00 3 Eprom board $27.00. ROM One Replacement $16.00.

SYSTEM 80 LOWER CASE KIT

3 Dot descenders, easy to install Plug in board with 2 sockets for two character sets which can be Port switched or externally switched. Comes standard with one custom Character Generator and full installation and Port switching instructions ROM One Replacement can be fitted for Permanent Lower case driver. $40.00 Kit. $50.00 Fitted. Fancy Games set character generator $14.00

TRS-80 LOWER CASE KIT

3 dot descenders and easy Plug in board. American models only. SPECIAL! $19.00 Kit. $25.00 Fitted.

32 OR 48K ON BOARD MEMORY UPGRADE

48K Upgrade uses the new 64K iC's No Piggy backed chips! Less power drain. 32K $45.00 48K $95.00.

OTHER MODIFICATIONS INCLUDE:

System 80 CHR$(23) mod as per Tandy, Sound mod, Inverse video, Extra keys, Fitted only. Repairs, Eprom copying and mods of your own choice.

Contact Geoff Lohrere at:

57A STANLEY AVE, MT WAVERLEY 3149

PHONE: (03) 543 1485

PROGRAMS

```
00160 REM WAITING
00170 CLEAR:DIM G(6),P(6)
00180 S=10000
00190 T=9:Z=33
00200 RESTORE 250
00210 L=7
00220 FOR C=9472 TO 9538
00230 READ D:POKE C,D
00240 NEXT C
00250 DATA 197,33,0,48,54,0,225,205
00260 DATA 17,37,192,33,0,48,54
00270 DATA 1,201,62,1,211,11
00280 DATA 14,12,17,18,19,62,17,211,12
00290 DATA 219,13,124,237,89,211,13
00300 DATA 125,237,81,211,13,62,31
00310 DATA 211,12,211,13,237,64,242
00320 DATA 48,37,237,64,203,112,62
00330 DATA 0,211,11,192,175,201
00340 CLS
00350 RESTORE 390
00360 FOR A=-1008 TO -961
00370 READ B:POKE A,B
00380 NEXT A
00390 DATA 2, 33, 16, 40, 65, 195, 127, 63, 31, 56, 126, 255, 15, 3, 93, 127
00400 DATA 16, 57, 254, 254, 147, 17, 255, 255, 195, 189, 126, 255, 231, 129, 0,
 0
00410 DATA 128, 8, 16, 40, 4, 134, 252, 248, 240, 24, 124, 254, 240, 224, 111, 1
27
00420PCG
00430 FOR X=0 TO 6:A=INT(RND*21)*3:B=INT(RND*14)+2:P(X)=A:G(X)=B:NEXT X
00440 X=0
00450 FOR X=0 TO 6
00460 S=S-5:CURS 54,1:NORMAL:PRINT"SCORE"S:PCG
00470 IF L=0 THEN GOTO 690
00490 CURS Z,T:PRINTCHR$(160):CURSZ+2,T:PRINTCHR$(160)
00500 M=USR(9472,288):IFPEEK(12288)=0 AND T>1 THEN LET T=T-1
00510M=USR(9472,96):IFPEEK(12288)=0ANDT<15THENLETT=T+1
00520 M=USR(9472,750):IFPEEK(12288)=0 AND Z<60 THEN LET Z=Z+3
00530 M=USR(9472,718):IFPEEK(12288)=0 AND Z>3 THEN LET Z=Z-3
00540 CURS Z,T:PRINTCHR$(60):CURSZ+2,T:PRINTCHR$(62);
00550 F=(64*T)+Z+61376:IF PEEK(F)<>194 THEN 600
00560 PLAY3;4;5;4:CURS Z,T:PRINT CHR$(160);CHR$(160);CHR$(160);
00570 FOR V=0 TO 6
00580 IF P(V)=Z AND G(V)=T THEN LET P(V)=255:L=L-1:NEXT#V 680
00590 NEXT V
00600 S=S-5:IF P(X)=255 THEN NEXT X:GOTO 440
00610 S=S-5:A=INT(RND#4):CURS P(X),G(X):PRINT CHR$(160);CHR$(160);CHR$(160);
00620 IF A=0 AND P(X)<0 THEN LET P(X)=P(X)-3:GOTO 660
00630 IF A=1 AND P(X)<63 THEN LETP(X)=P(X)+3:GOTO 660
00640 IF A=3 AND G(X)<1 THEN LET G(X)=G(X)-1:GOTO 660
00650 IF G(X)<15 THEN LETG(X)=G(X)+1
00660 CURS P(X),G(X)
00670 PRINT"ABC";
00680 NEKT X:GOTO 440
00690 CLS
00700 NORMAL
00710 PLAY 3;5;3;7;9;3;7;2;6;2;5;2
00720 CURS 404:PRINT"E N D   O F   G A M E"
00730 CURS 532:PRINT"YOUR SCORE WAS "S
00740 CURS 896:INPUT"DO YOU WANT TO PLAY AGAIN (Y/N)?";A1$:IF A1$="Y" OR A1$="YE
S" THEN GOTO 90 ELSE END
```

French Test Card

From Bryan Skinner comes an educational program for the Apple. The program teaches you, or tries to teach you, some of those nasty irregular French verbs. It does this by feeding the pupil the infinitive of the verb and then a random part, i.e. for savoir the user may be given 'je'. The reply should be sais. The test then continues for ten goes playing various tunes.

```
1  HOME : VTAB 10: HTAB 5: FLASH : PRINT "IRREGULAR FRENCH VERBS": NORMAL
     : VTAB 11: HTAB 5: INVERSE : PRINT "********* ****** *****": NORMAL
2  CLEAR :S = 1:GO = 0:SC = 0
5 NV = 6
10  DIM INF$(10): DIM EN$(6,8)
15  DIM RP(11): DIM RV(11)
20  DIM PF$(9): DIM PE$(9)
25  GOSUB 5000
50  GOSUB 7000
100  REM ****  INFO ****
110  HOME
120  VTAB 5: PRINT "     THIS PROGRAM WILL TEST YOU ON SIX"
130  VTAB 7: PRINT "IRREGULAR FRENCH VERBS"
140  VTAB 9: PRINT "     THE VERBS ARE:"
145  REM *** VERBS ****.
150  VTAB 13: INVERSE : PRINT "SAVOIR, DEVOIR, VOULOIR, POUVOIR,": NORMAL
     : PRINT : INVERSE : PRINT "BOIRE, CROIRE": NORMAL
160  VTAB 17: PRINT "     IF YOU WANT TO CHECK HOW ": VTAB 19:
```

PROGRAMS

```
   PRINT "THESE VERBS GO, PRESS C "

 170  VTAB 23: PRINT "PRESS THE SPACE BAR FOR A TEST"
 200  GET M$: IF M$ <  > "C" AND M$ <  > " " THEN 200
 210  IF M$ = "C" THEN  GOSUB 8000
1000  REM
1007  HOME : SPEED= 255
1008 FF =  FRE (0)
1010 Z =  INT ( RND (1) * 8) + 1
1020 V =  INT ( RND (1) * 6) + 1
1030  GOSUB 4000: IF FO = 1 THEN 1008
1035 VF$ = INF$(V):PF$ = PF$(Z):Q$ = EN$(V,Z)
1038 GO = GO + 1
1039 X = 2
1040 PL =  LEN (PF$)
1050  VTAB 3: INVERSE : PRINT "GO";: NORMAL : PRINT " ";: INVERSE : PRINT
     GO: NORMAL
1085  VTAB 8: HTAB PL + 2: PRINT "(";VF$;")"
1090  VTAB 20: PRINT "TYPE THE CORRECT LETTERS,": PRINT : PRINT
     "THEN PRESS RETURN"
1110  VTAB 10: PRINT PF$;" ";
1120  INPUT TR$
1122  VTAB 20: CALL  - 958
1125  VTAB 19: PRINT "YOUR ANSWER IS ";: INVERSE
1130  IF TR$ = Q$ THEN  GOSUB 3800: GOSUB 3500
1135  IF TR$ <  > Q$ THEN  GOSUB 3850: GOSUB 4200
1210  IF GO < 10 THEN  GOTO 1007
1220  HOME : VTAB 10: PRINT "YOU SCORED ";SC;" OUT OF ";GO
1225  PRINT : PRINT : PRINT

1230  IF SC <  = 3 THEN  PRINT "THAT'S NOT VERY GOOD"
1250  IF SC >  = 3 AND SC < 6 THEN  PRINT "THAT'S AVERAGE"
1255  IF SC >  = 6 AND SC < 9 THEN  PRINT "THAT'S PRETTY GOOD"
1260  IF SC >  = 9 THEN  PRINT "THAT'S VERY GOOD"
1270  CALL  - 912: VTAB 23: HTAB 25: PRINT "'BYE": END
1998  END
1999  REM  PEOPLE
2000  REM *** PEOPLE - FR, EN6
2010  DATA   "JE","I","TU","YOU","ELLE","SHE","IL","HE","NOUS","WE","VOUS"
     ,"YOU","ILS","THEY","ELLES","THEY"
2049  REM *** INFS
2050  REM *** 6 IRREGS
2060  DATA SAVOIR,DEVOIR,VOULOIR,POUVOIR,BOIRE,CROIRE
2069  REM  *** ENDS
2080  DATA  SAIS,SAIS,SAIT,SAIT,SAVONS,SAVEZ,SAVENT,SAVENT
2082  DATA DOIS,DDIS,DOIT,DOIT,DEVONS,DEVEZ,DOIVENT,DOIVENT
2085  DATA VEUX,VEUX,VEUT,VEUT,VOULONS,VOULEZ,VEULENT,VEULENT
2090  DATA  PEUX,PEUX,PEUT,PEUT,POUVONS,POUVEZ,PEUVENT,PEUVENT
2100  DATA BOIS,BOIS,BOIT,BOIT,BUVONS,BUVEZ,BOIVENT,BOIVENT
2110  DATA CROIS,CROIS,CROIT,CROIT,CROYONS,CROYEZ,CROIENT,CROIENT
2499  REM  SHORT PAUSE
2500  FOR W = 1 TO 1000: NEXT : RETURN
2599  REM  MED PAUSE
2600  FOR W = 1 TO 2000: NEXT : RETURN
2699  REM  LONGISH PAWS
2700  FOR W = 1 TO 5000: NEXT : RETURN
3500  VTAB 19: CALL  - 958
3501  REM *** CORRECT
3502  SPEED= 50: PRINT "RIGHT": SPEED= 255: CALL  - 958: NORMAL
3505 SC = SC + 1
3510  VTAB 21: PRINT "SCORE= ";: FLASH : PRINT SC;: NORMAL : PRINT " OUT O
     F ";GO

3515  GOSUB 4217
3520  GOSUB 3700
3540  RETURN
3700  VTAB 23: HTAB 5: INVERSE : PRINT "PRESS THE SPACE BAR TO CONTINUE";:
     NORMAL : GET M$: IF M$ <  > " " THEN 3700
3710  RETURN
3800  REM  ****** RIGHT TUNE
3805 F = 736:LN = 737:T = 738
3810  FOR I = 1 TO 3: FOR T1 = 150 TO 10 STEP  - 5
3820  POKE F,T1: POKE LN,10: CALL T
3830  NEXT T1: NEXT I: RETURN
3850  REM  ****** WRONG TUNE
3855 F = 736:LN = 737:T = 738
3860  FOR I = 1 TO 2: FOR T1 = 150 TO 255 STEP 30
3870  POKE F,T1: POKE LN,100: CALL T
3880  NEXT T1: NEXT I: RETURN
4000  REM *** CHECK FOR REPEATS


4001 FO = 0
4005  IF GO > NV THEN  FOR I = 1 TO GO:RV(I) = 0: NEXT I
4007  IF GO > 8 THEN  FOR I = 1 TO 8:RP(I) = 0: NEXT I
4010  FOR I = 1 TO GO
4020  IF RP(I) = Z OR RV(I) = V THEN FO = 1: RETURN
4030  NEXT I
4040 RP(GO) = Z:RV(GO) = V
4100  RETURN
4200  VTAB 19: CALL  - 958
```


EXCLUSIVE EDUCATIONAL PROGRAMS

For the TRS-80 Models I and III, System 80, etc.

For Catalogue
Send large Self Addressed Envelope to:

PROGRAMMED TEACHING SERVICES
25 Oaktree Road,
Croydon Vic 3136

★★★ FOR HIRE ★★★

MICROCOMPUTER FOR WEEKLY RENTAL

Apple IIe Computer
Green Phosphor Monitor
Disk Drive
Joystick

Z80 COMPUTER HIRE & SALES

7 Days a Week

TELEPHONE: (07) 358 5408
P.O. Box 415 F-Valley, Qld 4006

Lothlorien Software

Cultivating New Concepts

COMPUTER SOFTWARE SPECIALISTS

apple

EDUCATION
FRENCH & GERMAN TUTORS
SPELLING & SPEED READING
AUSTRALIAN GEOGRAPHY
THE UNIVERSAL TUTOR
SCHOOL RECORDS & REPORTS

ADMIN. & FILING
ARCHIVE—BIBLIOGRAPGY—FILING
THE LIBRARY CATALOGUE
THE LIBRARIAN'S ASSISTANT
— Loan System —

GAMES
THE CAVERNS OF MORDIA

G.P.O. BOX 1033, SYDNEY 2001
Telephone: (02) 398 4023

COMPUTER BOOKSHELF

Now you have bought your computer, you want to make the most of it.

We supply general and specialized books on computer hardware, software and languages.

Shop for your computer books at home, and write for our free list of recommended books for your computer.

Orders over $20 post and package free, otherwise add $1 per book.

READING MATTERS
P.O. Box 127, Hornsby, NSW 2077

CRICKET FOR THE MICROBEE

Excellent Program giving all the features of our Summer Game.

Enquiries and Orders to:

COMPUTER BIZ
P.O. Box 240E, Ballarat 3350
Telephone: (053) 32 4243

Cost **$24.95** Including Postage and Handling

apple SOFTWARE

® ZAXXON	$57.95
Wizardry#3	$57.95
The Quest	$28.95
Ultima 3	$78.95
Stellar 7	$49.95
Fathoms 40	$49.95
Lode Runner	$49.95
Pensate	$28.95
Buzzard Bait	$57.95
Trompers	$42.95
Bank St. Writer	$98.00
Minit Man	$28.95
Gruds In Space	$49.95
High Rise	$47.95
Sammy Lightfoot	$54.95
Rear Guard	$42.95
Caverns of Callisto	$49.95
Go	$49.95
★ Oric 2(64K) Computers	$399.00
★ National Hippo Drives to suit Apple® Computers	$380.00
★ Mimco Joystick	$95.00
★ Verbatim Diskettes (Box of 10)	$45.00
★ Verbatim head Clean Kit	$11.80

- Over 600 software listings!
- Software may be rented for Evaluation
- Send for free Catalogue to:

THE AUSTRALIAN SOFTWARE LIBRARY
P.O. Box 808, Renmark SA 5341
Telephone: (085) 88 2877

PROGRAMS

```
 4205  SPEED= 50: PRINT "WRONG": NORMAL : SPEED= 255
 4210  VTAB 21: PRINT "THE ANSWER SHOULD BE:.....";: FLASH : PRINT Q$: NORMAL

 4212  GOSUB 4217
 4213  VTAB 21: CALL  - 868: PRINT "SCORE= ";: FLASH : PRINT SC;: NORMAL :
       PRINT " OUT OF ";GO
 4214  GOSUB 3700
 4215  RETURN
 4217  NORMAL
 4218  SPEED= 200:H1 = 25:H2 = 34
 4219 H3 = 16
 4220  VTAB 1: HTAB H1 - 2: INVERSE : PRINT "PEOPLE";: NORMAL : HTAB H2 - 2
       : INVERSE : PRINT "ENDINGS": NORMAL
 4230  FOR I = 1 TO 8
 4233 VT = 2 * I
 4234 .VTAB VT: HTAB H1: PRINT PF$(I); TAB( H2);EN$(V,I)
 4236  IF I = Z THEN  VTAB VT: HTAB H2: FLASH : PRINT EN$(V,I): NORMAL
 4240  NEXT I
 4250 LQ =  LEN (Q$)
 4255  SPEED= 220 - 20 * (LQ < 3)
 4260  FOR T = H2 TO H3 STEP  - 1
 4265  IF T < H1 THEN  VTAB 2 * Z: HTAB H1: INVERSE : PRINT PF$(Z): NORMAL

 4270  VTAB 2 * Z: HTAB T: FLASH : PRINT Q$;: NORMAL : PRINT  SPC( LQ)
 4280  NEXT T
 4285  VTAB 2 * Z: HTAB H1: INVERSE : PRINT PF$(Z): NORMAL
 4290 D =  ABS ((2 * Z) - 10):VT = 2 * Z
 4300  IF VT < 10 THEN VH = 1
 4310  IF VT > 10 THEN VH =  - 1
 4320  IF VT = 10 THEN VH = 1
 4330  FOR T = 0 TO D
 4340  VTAB VT + (VH * T): HTAB H3: FLASH : PRINT Q$: NORMAL
 4350  VTAB (2 * Z + (VH * T)) - VH: HTAB H3: NORMAL : PRINT  SPC( LQ)
 4370  NEXT T
 4375  VTAB 10: HTAB H1: PRINT "NOUS"
 4376 A =  LEN (PF$) + 1
 4380  FOR Q = H3 TO A + 1 STEP  - 1
 4390  VTAB 10: HTAB Q: FLASH : PRINT Q$;: NORMAL : PRINT  SPC( LQ): HTAB H
       1: PRINT "NOUS"
 4400  NEXT Q
 4410  VTAB 10: HTAB H1: PRINT "NOUS"
 4420  SPEED= 255
 4999  RETURN

 5000  REM ***** READ PEOPLE, INFS & ENDS
 5010  REM ***** INTO $S
 5020  FOR P = 1 TO 8
 5030  READ A$
 5040 PF$(P) = A$
 5050  READ A$:PE$(P) = A$
 5055  NEXT P
 5060  FOR VB = 1 TO 6
 5070  READ A$
 5075 INF$(VB) = A$
 5076  NEXT VB
 5080  FOR VB = 1 TO 6: FOR PP = 1 TO 8
 5090  READ A$
 5100 EN$(VB,PP) = A$
 5120  NEXT PP: NEXT VB
 5130  RETURN
 7000  DATA  173,48,192,136,208,5,2
             06,225,2,240,9,202,208,245,1
                 74,224,2,76,226,2,96
 7010  FOR I = 738 TO 758: READ R: POKE I,R: NEXT
 7020  RETURN
 8000  REM  **** CHECK HOW VERBS GO
 8005  INVERSE
 8010  HOME
 8020  VTAB 5: PRINT "     CHOOSE BETWEEN:": NORMAL
 8030  VTAB 10: PRINT "1...SAVOIR"
 8040  VTAB 12: PRINT "2...DEVOIR"
 8050  VTAB 14: PRINT "3...VOULOIR"
 8060  VTAB 16: PRINT "4...POUVOIR"
 8070  VTAB 18: PRINT "5...BOIRE"
 8080  VTAB 20: PRINT "6...CROIRE"
 8085  VTAB 22: PRINT "7...BEGIN A TEST"
 8090  GET XX$:XX =  VAL (XX$): IF XX < 1 OR XX > 7 THEN 8000
 8095  HOME
 8100  IF XX = 7 THEN  RETURN
 8105  INVERSE
 8110  VTAB 1: HTAB 15: PRINT INF$(XX)
 8120  NORMAL
 8150  FOR I = 1 TO 8
 8155 PF$ = PF$(I)
 8160 VV$ = EN$(XX,I): IF VV$ = "AI" THEN PF$ = "J'"
 8170  VTAB 2 + I + 1: HTAB 12: PRINT PF$;: HTAB 18: PRINT VV$
 8180  NEXT I
 8190  GOSUB 3700
 8200  GOTO 8000
```

MICROCOMPUTER SOFTWARE MADE SIMPLE!

Business software for microcomputers is Padmede's specialty.

For first time users and for those with no need of complex and confusing option oriented programs, Padmede systems are the answer.

Systems that are:—

- Easy to install
- Easy to operate
- Trouble free
- Fully supported.

and provide immediate results

At **$390** per accounting module Padmede represents the best microcomputer software value in Australia today.

Available on all microcomputers that support CP/M and MS/DOS.

Padmede Commercial Systems
26 Ridge Street, North Sydney, 2060.
(02) 923-2899

TRAVERS SOFTWARE SERVICES
262 High Street,
Kew, VIC. 3101.
(03) 862-2644

PROLOGIC PTY. LTD.
38 Montpelier Retreat,
Battery Point, TAS. 7000
(002) 34-6499

CONSULTECH
55 Colin Street,
Perth, W.A. 6005
(09) 322-1295

Software Spectrum

Box 2101 GPO,
Adelaide 5001.
Phone: (08) 51 4868
Open 9 am - 6 pm Mon-Sun

25 Selby Street, Adelaide 5000

TRS 80® COLOR COMPUTER SOFTWARE SPECIALISTS

Xmas Specials

ARCADES		ARCADES		ADVENTURES	
Astro Blast 16K	$22.00	Labyrinth 16KECB	$22.00	Adventure Trilogy 16K Graphic	$22.00
Caterpillar 16K	$22.00	Haywire 16K	$22.00	Cimeeon Moon 16K Graphic	$22.00
Cave Hunter 16K	$22.00	Planet Raiders 16K	$22.00	Fembots Revenge 32K Graphic	$22.00
Cessna Lander 16K	$22.00	Rail Runner 16K	$22.00	Shannanigans 32K Graphic	$22.00
Cosmic Clones 16K	$22.00	Juniors Revenge 32K	$22.00	Sea Quest 32K Graphic	$22.00
El Bandito 16K	$22.00	Doodle Bug 16K	$22.00	Wizards Tower 32KECB Graphic	$22.00
Glaxxons 16K	$22.00	Venturer 16K	$22.00	Black Sanctum 16K	$19.00
Gran Prix 16K	$22.00	Zaksund 16K	$22.00	Calixto Island 16K	$19.00
Demon Assault 16K	$22.00				

All products come with an unconditional Guarantee. If defective return within 15 days for replacement

Dealer inquiries invited

SEND SELF ADDRESSED ENVELOPE FOR FREE CATALOGUE

To: SOFTWARE SPECTRUM, Box 2101 GPO, Adelaide 5000.

New Zealand Bankcard welcome

Mr/Mrs/Miss/Ms ..... Address ..... P/code .....

Phone ..... Please charge Bankcard No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐☐☐ Exp. Date ..... Sig .....

TRS80 the registered trademark of Tandy Corp.

Road Rally

by Martin Scragg

Although the idea of a racing car type program is not new, this version contains a machine code subroutine that scrolls down so as to make it more like the arcade version. The program also contains packed strings so that initialisation time is reduced after the program is first run and saved.

The strings are packed by the subroutine starting at line 10000. The string 'A' is the machine code subroutine to scroll the screen down, the rest are for graphics used in the title and in the program.

First type in the program as listed (REM statements can be removed as they only indicate what the various parts do) then save the program. Next run the program and wait for the title to appear, press shift-break to stop the program then delete lines 10010 to 10170 and alter the end of line 10000 to read 10000 LS=PEEK (VARPTR(A) + 1) :MS=PEEK(VARPTR(A) + 2 : POKE 16526,LS:POKE16527,MS:RETURN then save the program.

Line 10 can be left out if you do not wish the break key to function as a shift-break. Line 10000 is the only line that needs to be altered for disk users. People without joysticks can delete the reference to 'J' in lines 520, 530 and 540. The program with REM statements and data fits into approximately 5.5k, without REMs and with the strings packed and data deleted the program will fit into approximately 3.5k. Full instructions are included in the program.

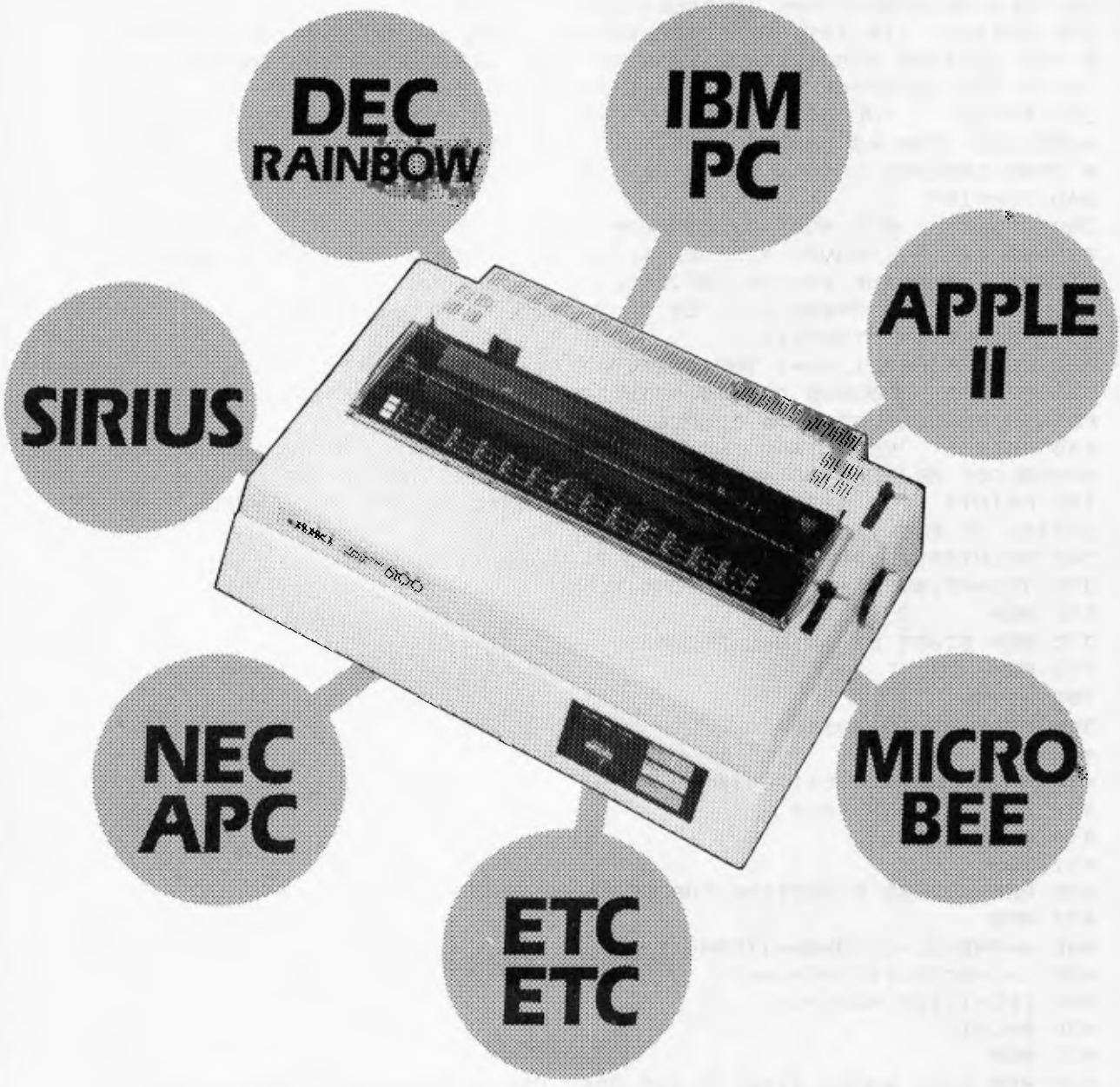
The program is listed with 64 characters per column to make it easier to type in and correct mistakes. Note that the string 'T$(0) contains 40 spaces.

```
0 REM ***********************************
1 REM *             ROAD RALLY          *
2 REM *  WRITTEN BY M.SCRAGG.  1983.    *
3 REM *   FOR A SYSTEM-80 / TRS-80.     *
4 REM ***********************************
5 REM
6 REM SET UP VARIABLES AND CHANGE BREAK TO WORK AS SHIFT-BREAK.
7 REM NUMBERS IN QUOTES ARE THE NUMBER OF SPACES IN THEM.
8 REM
10 POKE16396,165
20 CLEAR300:DEFSTR A-F:DEFINT G-Z
30 A="      12      ":B="BONUS":C="      16          ":D="      13
   ":E="  4 ":F=" ROAD NARROWS "
40 T$(0)="                                        "
50 T$(1)="            23            "
60 T$(2)="                          "
70 T$(3)="                          "
80 T$(4)="                          "
90 T$(5)="                          "
100 T$(6)="                           "
101 REM
102 REM SCROLL TITLES DOWN AND WAIT FOR INPUT
103 REM
110 CLS:GOSUB10000
120 PRINT@18,"WRITTEN BY M.SCRAGG.  1983.";:Z=USR(0)
130 PRINT@18,T$(0);:FORX=1TO3:Z=USR(0):NEXT
140 FORX=1TO3:PRINT@20,T$(X);:Z=USR(0):NEXT
150 PRINT@20,T$(0);:Z=USR(0)
160 FORX=4TO6:PRINT@20,T$(X);:Z=USR(0):NEXT
170 PRINT@20,T$(0);:FORX=1TO3:Z=USR(0):NEXT
180 FORLL=1TO50
190 PRINT@70,"PRESS < NEW LINE > TO PLAY, < I > FOR INSTRUCTIONS
.";
200 I$=INKEY$:IFI$="I"THEN260ELSEIFI$=CHR$(13)THENSC=0:NC=5:GOTO
380
210 PRINT@76,"              ";:PRINT@98,"      ";:FORTD=1TO70:NEXT
220 PRINT@76,"< NEW LINE >";:PRINT@98,"< I >";:FORTD=1TO70:NEXT
```

```
230 NEXTLL
231 REM
232 REM IF KEY NOT PRESSED IN TIME LIMIT THEN SCROLL TITLE.
233 REM
240 FORX=1TO2:Z=USR(0):FORTD=1TO30:NEXT:NEXT
250 GOTO120
251 REM
252 REM PRINT INSTRUCTIONS
253 REM
260 CLS:PRINT@21,"-=< INSTRUCTIONS >=-":PRINT
270 PRINT"   IN THIS GAME YOU CONTROL THE RACING CAR USING EITHE
R THE LEFTAND RIGHT ARROW KEYS TO MOVE LEFT AND RIGHT RESPECTIVE
LY OR THE JOYSTICK FOR LEFT AND RIGHT MOVEMENT.":PRINT
280 PRINT"   THE OBJECT OF THE GAME IS TO KEEP THE RACING CAR TR
AVELLING  FOR AS LONG AS POSSIBLE WITHOUT RUNNING OFF THE ROAD O
R CRASHINGINTO ROAD BLOCKS THAT ARE PLACED AT RANDOM ALONG THE R
OAD.":PRINT
290 PRINT"   THE ROAD WINDS FROM SIDE TO SIDE AND WILL BECOME NA
RROWER AS YOU TRAVEL FURTHER ALONG IT UNTIL IT BECOMES SLIGHTLY
WIDER    THANTHE RACING CAR.":PRINT
300 PRINT@914,"PRESS ANY KEY TO CONTINUE";:I$=INKEY$
310 IFINKEY$=""THEN310
320 CLS:PRINT@21,"-=< INSTRUCTIONS >=-":PRINT
330 PRINT"   POINTS ARE AWARDED FOR DISTANCE TRAVELED AND BONUS
POINTS FORCOMPLETING A COURSE.":PRINT
340 PRINT"   YOU START THE GAME WITH FIVE CARS.  RUNNING INTO A
ROADBLOCK OR RUNNING OFF THE ROAD WILL COST YOU A CAR.":PRINT
350 PRINT"   AN EXTRA CAR WILL BE AWARDED AT THE SUCCESSFUL COMP
LETION OF EVERY COURSE.":I$=INKEY$
360 PRINT@912,"PRESS ANY KEY TO BEGIN PLAYING";
370 IFINKEY$=""THEN370ELSESC=0:NC=5
371 REM
372 REM START OF ACTUAL PROGRAM
373 REM
380 L1=20
390 FORT1=10TO100STEP10
400 CLS
410 P=909:L=74:R=L+I:S=15360
420 FORI=L1TO6STEP-2
430 FORT=1TOT1
431 REM
432 REM CHOOSE DIRECTION FOR ROAD TO WIND
433 REM
440 W=RND(3)-2:FORQW=1TORND(5)+5
450 L=L+W:IFL<67THENL=67
460 IFL+I>125THENL=L-1
470 R=L+I
471 REM
472 REM PICK WHICH SIDE OF THE ROAD FOR A ROADBLOCK AND IF ONE
473 REM CAN BE DRAWN YET
474 REM
480 Q=RND(2):IFQ=1THENQ=-5
490 IFRND(3)=3ANDI>12ANDRB<OTHENPRINT@(L+I/2)+Q,E;:RB=8
500 RB=RB-1
501 REM
```

The Juki 6100 Daisy Wheel Printer suits all these and many more personal computers **$995**

INCLUDING TAX



Ring Mitsui or your local retailer for details

Mitsui Computer

1–3 Rodborough Rd Frenchs Forest NSW 2086 Telephone (02) 451 7711
303 Coronation Drive Milton QLD 4064 Telephone (07) 369 7799
131 Sturt Street South Melbourne VIC 3205 Telephone (03) 690 6722

```
502 REM PRINT GRASS AND CENTRE STRIP
503 REM
510 PRINT@64,STRING$(L-64,153);:PRINT@L+I/2,"!";:PRINT@R,STRING$
(127-R,166);:Z=USR(0):PRINT@P,C;


511 REM
512 REM TEST KEYBOARD AND JOYSTICK FOR INPUT
513 REM
520 K=PEEK(14400):J=255-INP(127)
530 IFKAND32ORJAND4THENP=P-1:IFP<900THENP=900
540 IFKAND64ORJAND8THENP=P+1:IFP>955THENP=955
550 IFPEEK(S+P-64)>128ORPEEK(S+P-61)>128THEN630
560 SC=SC+1:NEXT@W:NEXTT
570 IFR>110THENPRINT@134,F;ELSEPRINT@174,F;
580 SC=SC+10:NEXTI


581 REM
582 REM END OF COURSE
583 REM
590 FORO=1TO20:PRINT@25,B;:FORX=1TO70:NEXT:PRINT@25,"      ";:FOR
X=1TO70:NEXT:NEXT

600 SC=SC+100:NC=NC+1:L1=L1-2:IFL1<6THENL1=6
610 NEXTT1
620 GOTO380
621 REM
622 REM CAR CRASHED, PRINT SCORE AND CARS REMAINING
623 REM
630 PRINT@P,D;
640 FORX=1TO300:NEXT
650 P=L+I/2+832
660 NC=NC-1:IFNC=0THEN680


670 CLS:PRINT@400,"YOU HAVE"NC"CAR(S) REMAINING.";:PRINT@470,"YO
UR SCORE IS"SC;:FORX=1TO1200:NEXT:CLS:GOTO430
671 REM
672 REM GAME OVER MESSAGE
673 REM
680 G$="GAME OVER":PP=25:FORX=1TO9:PRINT@PP+X,MID$(G$,X,1);:FORT
D=1TO80:NEXT:NEXT
690 FORZ=1TO1000:NEXT

691 REM
692 REM TEST FOR HIGHEST SCORE AND GET NAME IF SO
693 REM

700 IFSC>HSTHENHS=SC:CLS:PRINT@395,;:INPUT"ENTER YOUR NAME FOR H
IGHTEST SCORE ";H$

710 IFH$=""THENH$="????"
711 REM
```

```
711 REM
712 REM PRINT SCORE, HIGHEST SCORE AND CHAMPIONS NAME
713 REM
720 CLS:PRINT@340,"YOUR SCORE WAS"SC:PRINT@446+((64-(LEN(H$)+25)
)/2),"HIGHEST SCORE IS"HS"BY "H$:FORTD=1TO2000:NEXT
730 GOTO110
801 REM
802 REM SUBROUTINE TO PACK STRINGS SO THAT LESS TIME IS SPENT
803 REM SETTING UP THE PROGRAM WHEN IT IS RUN.
804 REM
805 REM THE STRING 'A' CONTAINS THE SUBROUTINE THAT SCROLLS
806 REM THE SCREEN DOWN.
807 REM
901 REM AFTER RUNNING THIS PROGRAM PRESS SHIFT-BREAK TO STOP
902 REM IT, THEN ALTER LINE 10000 TO READ
903 REM '10000 LS=PEEK(VARPTR(A)+1):MS=PEEK(VARPTR(A)+2):POKE
904 REM 16526,LS:POKE16527,MS:RETURN'
905 REM
10000 LS=PEEK(VARPTR(A)+1):MS=PEEK(VARPTR(A)+2):POKE16526,LS:POK
E16527,MS:L=LS+256*MS

10010 FORI=0TO11:READN:POKEL+I,N:NEXT
10020 L=PEEK(VARPTR(C)+1)+256*PEEK(VARPTR(C)+2):FORI=0TO15:READN
:POKEL+I,N:NEXT
10030 L=PEEK(VARPTR(D)+1)+256*PEEK(VARPTR(D)+2):FORI=0TO12:READN
:POKEL+I,N:NEXT
10040 L=PEEK(VARPTR(E)+1)+256*PEEK(VARPTR(E)+2):FORI=0TO3:READN:
POKEL+I,N:NEXT
10050 FORX=1TO6
10060 L=PEEK(VARPTR(T$(X))+1)+256*PEEK(VARPTR(T$(X))+2):FORI=0TO
22:READN:POKEL+I,N:NEXT


10070 NEXT:RETURN
10080 DATA33,191,63,17,255,63,1,192,3,237,184,201
10090 DATA140,191,191,140,26,8,8,8,8,8,32,140,189,190,140,32
10100 DATA176,180,189,140,26,8,8,8,8,140,183,158,140
10110 DATA186,131,131,181
10120 DATA191,149,130,175,180,32,191,149,32,170,191,32,191,189,3
2,170,191,148,32,170,191,149,32
10130 DATA191,189,190,159,129,32,191,189,188,190,191,32,191,149,
32,170,191,32,32,170,191,149,32
10140 DATA191,159,143,191,180,32,160,190,143,189,144,32,191,149,
32,170,191,32,139,189,176,190,135
10150 DATA191,149,130,175,180,32,130,175,188,159,129,32,191,149,
32,170,191,32,191,189,188,159,129
10160 DATA191,189,190,159,129,32,191,149,32,170,191,32,191,189,1
88,190,191,32,191,149,32,170,191
10170 DATA191,159,143,191,180,32,160,190,143,189,144,32,160,190,
143,189,144,32,191,159,143,189,144
```

CHIP CHAT

Unkind enemies of Adam Osborne still at work inform us that "the unheard-of has happened. Adam Osborne has admitted he made a mistake".

Those who have never met the chemist turned programmer-pundit will have to accept it on trust: excessive modesty is not one of Adam's more worrying weaknesses.

The chink in the armour, however, is not the sort of thing to encourage any belief that Osborne's morale is slipping. In the words of an ex-colleague: "He believes he made a mistake when he hired Jaunich to take over the company. He now believes he should have continued to run the company himself. In other words, he was wrong to doubt his own infallibility. And, if our latest information is correct, is about to correct this error, by buying his own company back.

... Submarines are not the sort of thing which appear every month in *APC*, but readers might like to hear this little story. A new submarine in the Australian navy will be equipped with a group of computers forming an information and reminder service. The job of one computer will be to do no more than to monitor the temperature of the fat in the fish fryer...

The recent 'Computer Marathon' for 16-bit machines has provided some interesting evidence of reliability — or non-reliability — of the contesting machines. It is reported that, of the six machines taking part, only two completed the trial without breaking down — these were the Olivetti M20 and Samurai S-16. All the other competitors, which included the IBM PC, the Wang Professional and the LSI, broke down at least once, with the IBM suffering the most stoppages...

And now, following hardware, software, firmware *et al*, comes 'foamware' — a truly vital peripheral for all micro users. Micro Tie Systems Corporation of Albuquerque, New Mexcio has produced the Byte Bat — a 17-inch foam rubber baseball bat which 'gives users a harmless but satisfying way to strike back at computers'. $9.95 gets you the bat, a user manual, a badge, a two-colour poster showing the bat in use and a warning decal that advises 'this computer-friendly live-wire is protected by Byte Bat'. The Byte Bat is compatible with all computers and operating systems which makes it the first universally compatible foamware...

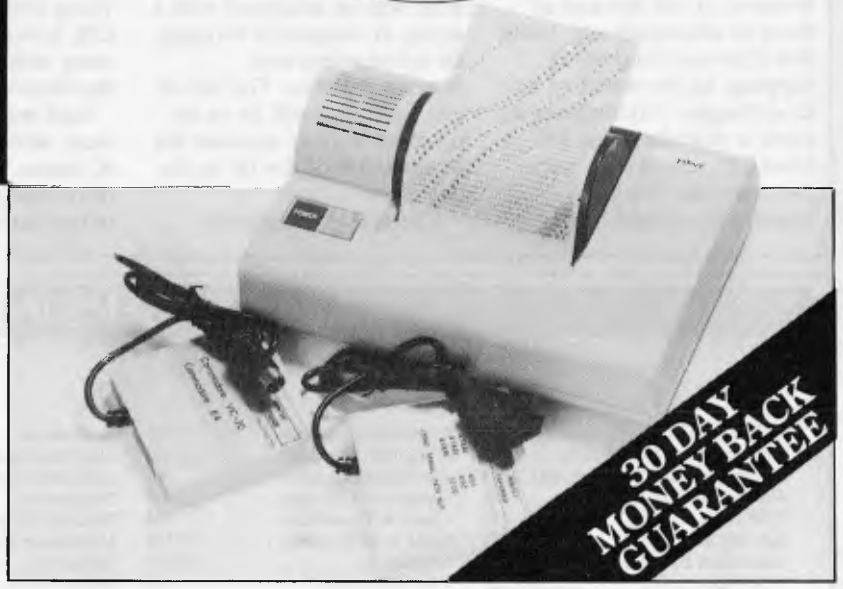
ADVERTISERS INDEX

ACT ..... IBC
Amust Computer Corporation ... 40
Anderson Digital Equipment 37
Arcom Pacific 78
ASP 159
Attache Software 71
Australian Exhibition Services 29
Australian Video Presentations 42
Automation Statham 106
Bayne & Trembath 33
BS Microcomp 129
BVP 25
Calcutronic 21,137
Case Communication 132
Caulfield Business Systems 156
Centre Industries 115
City Personal Computers 134
Commercial & Professional Microsystems 11,164
Compak Computer Centres 18,19,101,102
Complete Solutions 96
Computer Biz 168
Computer Classics 56
Computer Edge 85-92
Computer Focus 160
Computer Galerie 139
Computer Max 6
Computer Play 41,47
Computer Sensation 118
Computer Solutions 96
The Computer Spot 48
Computer Technics 130,131
Creative Electronics 34
CPM Data Systems 123,137
C-Tech 80,157
CW Electronics 109
Data Flow 45
Data Parts 1
Data Peripherals 32
Datascape 123
Deforest Software 145
Dicker Data ..... OBC
Digital Equipment Corp 44
Digital Source International 98
Direct Computer Sales 7
Entercom Computer Co 114,117
Fagan Microcomputer Systems 116
Futuretronics IFC,59,119
Gambit Games 161,163
Gametronics 12
Gameworx 13
Hi-Flight Computing Services 104
Hi Tech 57
Home Computers 113
Idiak Computer Products 148
Ideal Computer Products 94
Imagineering 8,83
Logitronics 164
Lion Electronics 114
Lothlorian Software 167
Magmedia 108
Maxwell Office Equipment 20
Melbourne House 22,23
Memorex 9
Merton Scott 93
Metropolitan Business Machine Co 17
Micro 80 1-4
Micro Educational 153
Micro Pro Computers 10,112
Microstore 78
Microtron 138
Microvisions 162
R.S. Miller 160
Multicomp 122
Multisoft 61
Mitsui 172
Nashua 38
New Generation Computer Store 64
Oscwell International 176
Output Media 54
OZI Soft 14,15,24,165
Padmede 169
Peninsula Office Services 31
Perimedia 113
Personal Computer Peripherals 110
Philitronic 75
Philth Programs 138
Prentice Hall 52
President Computers 65-68
Programmed Teaching Services 167
Progressive Software Publishers 51,53
Qasar Industries 142,143
Reading Matters 168
Robs Computer Centre 26,27
J.W. Ross 133
Scientific Devices 151
Scia Software Corporation of Australia 133
SI Microcomputer Products 127
Software Spectrum 169
Spectravideo 121
The House of Micro & Software 158
The Australian Software Library 168
Uni Co-op Bookshop 140
Valentine Sands 73
Videoactiv Electronics 30
Warbuton Franki 70
Z80 Computer Hire & Sales 167
Z80 Programming 166

PONY® THE AFFORDABLE COMPUTER PRINTER

1st Australian Release

$166
SALES TAX PAID



Features

- Atari/Commodore compatible.
- RS 232 or,
- Centronics Interface.
- Two lines/second.
- 40 characters/line.
- Full Graphics 320 x n Dot Graphics.
- 120 lines/minute.
- QUIET! (Very)
- Includes Cable.

Order before December 15 and get one FREE roll of Thermal Computer Paper, 40 metres x 110 mm.
Order NOW to get your Printer before Christmas*.

Another fine Printer from:
OSCWELL INTERNATIONAL AUSTRALIA PTY. LTD.
271 Blackburn Rd., Mt. Waverley, 3149. Vic.
(P.O. Box 432, Glen Waverley, 3150.)
Dealer Inquiries: Telephone: (03) 233 3716 or 233 9810.

OSCW 658B

Order to: Oscwell Pony, Oscwell International, P.O. Box 432, Glen Waverley, 3150, Victoria.

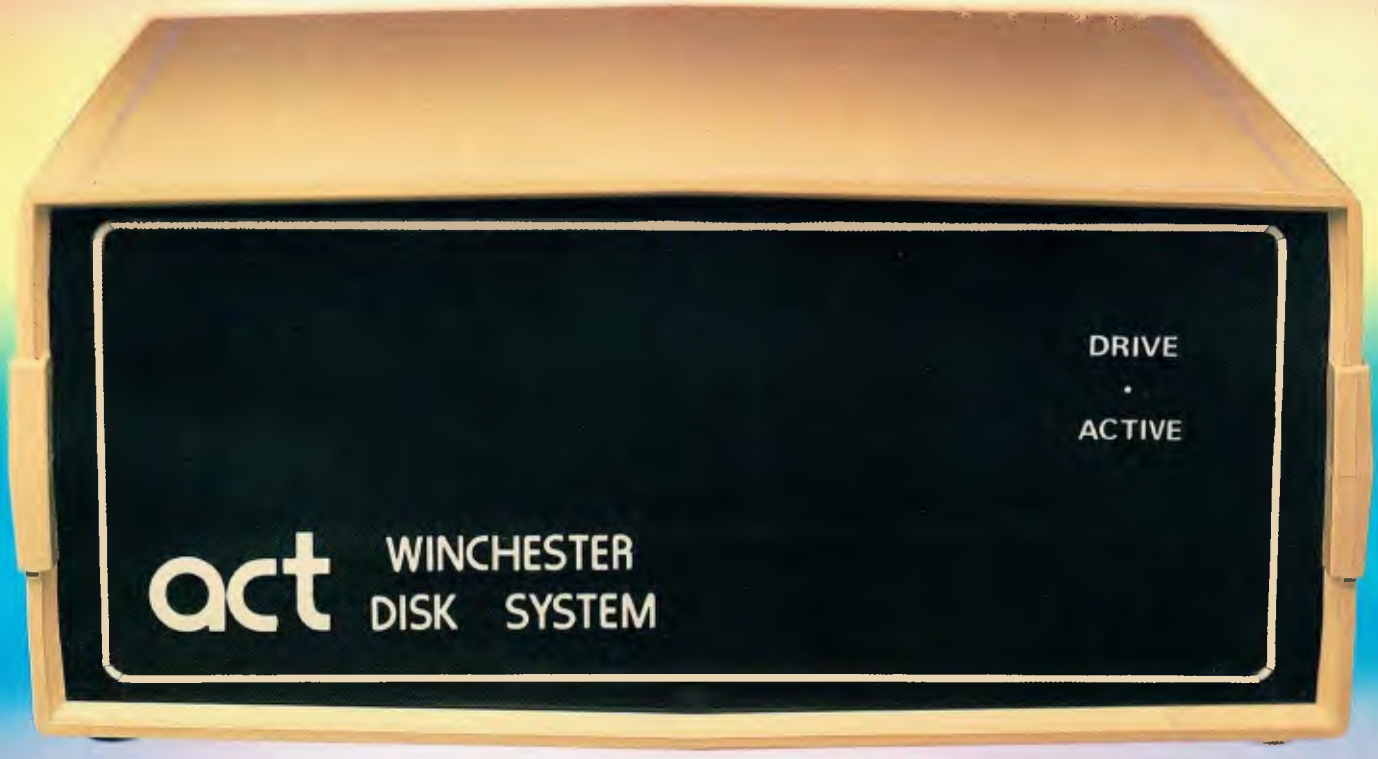
My Computer Interface is _____

PLEASE SEND ME Quantity	Item	Item Price (each)	Bankcard Welcome Total
_____	Pony	$166	$_____
	Interface		
_____	for Atari		$_____
_____	for Commodore		$_____
_____	Centronics	$39.90	$_____
_____	RS 232 Serial	$38.25	$_____
_____	Thermal Paper (Twin Pack)	$ 9.60	$_____
_____	Postage & Packing	$ 5.50	$_____
		I enclose cheque for	$_____

or
Please charge my Bankcard Number
_____
Expiry date / /
Name _____
Signature _____
Address _____
_____
_____ Postcode _____

*Prices subject to change without notice.

WE CAN GIVE YOU THE POWER!



Make the Right Decision for Your Computer Storage:

THE POWERFUL ACT

The ACT Hard Disk System upgrades your computer to a powerful high performance machine. Supported throughout Australia, the ACT HARD DISK is the answer to your storage problems. ACT, the affordable hard disk system.

THE RELIABLE ACT

Far greater storage than floppy drives with reliable performance under all conditions, makes the ACT Hard Disk unbeatable value. Designed and manufactured in Australia.

5-31 Megabytes of Hard Disk Storage.
5 Plus 5 Fixed/Removable Hard Disk.
5 Megabytes Removable Hard Disk Cartridge.

THE LOGICAL ACT

The obvious choice for your micro, the ACT HARD DISK is now available for:
APPLE II • IBM PC • DEC RAINBOW • PEACH • KAYPRO • OSBORNE • MICRO • DECISION • MICROBEE • HEATH ZENITH • NORTHSTAR • SANYO • SUPERBRAIN • TANDY • TIME OFFICE • TOSHIBA • XEROX • S 100 • SIGMA OKI • NEW RELEASE: SIRIUS & NEC APC.

THE SHAREABLE ACT — PC NET

PC Net is a hard disk sharing system — simple and cost effective. The disk is divided into logical drives, allowing independent users to share the disk. Available for most popular brands of microcomputer.

W.A.
MICRO E.D.P. HARDWARE,
9a/1 Leura Avenue,
Claremont, WA 6010
Phone: (09) 384 5511

N.S.W.
act
75 Willoughby Road,
Crows Nest, NSW 2065
Phone: (02) 439 6300
Telex: AA 24816

S.A.
COMPUTER MART PTY LTD,
123 Gouger Street,
Adelaide, SA 5000
Phone: (08) 51 5363, 212 2888

DEALER ENQUIRIES WELCOME

Dicker Data Business
Computer Centre
Open Sat. & Sun.

Call
for a free Xmas Catalogue

The Company Computer and The Company Network...

Your Linc with the future.

Your first Vector computer is the first building block to your future network.

Dual Processors

The Vector 4, The Company Computer, has dual processors, both 8 and 16 bit, meaning that it is going to be around a lot longer than some other computer systems and the Vector 4 range is flexible enough to fit any business, be it large or small.

LINC, The Company Network allows you to network up to 16 Vector 4's together so that everybody in your Company is always working with the latest information.

Low Initial Investment

LINC eliminates high initial investment because it takes advantage of existing resources. It lets one Vector computer communicate with another Vector computer, sharing data bases, software and peripherals.

While other networks require a large capital outlay for expensive and complicated file servers, LINC uses the disk drives in the stand alone computers that are attached to the network.

Simple, Yet Sophisticated

No dedicated master control station is required, reducing the investment required and preventing network shutdown due to failure of one or more stations.

Distributed Information

LINC improves inter-office communications. You can exchange information instantly with other departments.

Automate one department at a time, adding computers and peripherals as the need and budget dictates.

Flexibility and Growth

LINC meets your requirements today and has the flexibility to grow right along with your Company. Add workstations when and where they're needed. Individual workstations may be moved to another department without time consuming reconfiguration procedures.

This mobility assures full use of all network resources to solve real business problems.

Shared Peripherals

LINC allows every workstation to have access to any printer located anywhere on the network. As your system grows, you will continue to save thousands of dollars by sharing printers, plotters, modems, hard disk drives and other peripherals.

The Complete Range

The Vector 4 is available with one or two 630 k floppy drives, or a 5 or 10 megabyte hard disk drive. For business where you need a large amount of storage, Vector have also included a 36 megabyte hard disk.

Applications Software

Vector combines state-of-the-art computer technology with the kinds of applications software you need to be successful in your business. The Vector Professional Series is a fast, efficient and sophisticated series of applications programs for the Company Computer.

Personalised Service and Support

You don't have to be a computer expert either, as Dicker Data makes it simple, simple to use and simple to understand, allowing you to concentrate on your business.

Dicker Data have been selling and servicing Vector Graphic products for 5 years. Vector were one of the first companies to entre the micro-computer business. Our experience is invaluable to first time users or advanced programmers.

LINC™
THE COMPANY NETWORK.

VECTOR
THE COMPANY COMPUTER.

For more information contact:
HEAD OFFICE: Dicker Data Projects Pty. Ltd. 78 Captain Cook Drive, Caringbah. N.S.W. 2229. (02) 525 2122
DICKER DATA BUSINESS COMPUTER CENTRE: 261 George Street, Sydney. (02) 27 6662
N.S.W.: Albury — 21 3926, Chatswood — 411 1892, Coffs Harbour — 52 4077. **VICTORIA:** Hawthorn — 818 0794, Port Melbourne — 64 1372. **ADELAIDE:** (08) 223 4950. **WESTERN AUSTRALIA:** Leederville — 381 4444, Victoria Park — 362 4249. **QUEENSLAND:** (07) 391 9209